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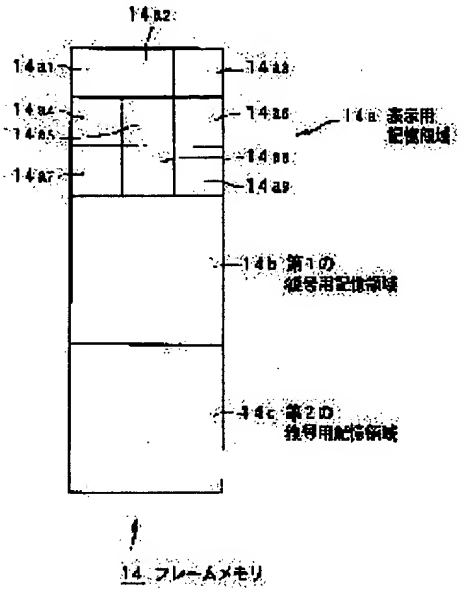
(54) SIGNAL REPRODUCING DEVICE AND METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a DVD reproduction device by which video images photographed at a plurality of angles recorded on a DVD are viewed without seam simultaneously or momentarily every time they are switched.
SOLUTION: A frame memory used for decoding video images in a DVD reproducing device that reproduces a DVD is made up of a display storage area 14a consisting of 9 storage areas corresponding to display of nine different video images such as video images at nine different angles and of a 1st decoding storage area 14b and a 2nd decoding storage area 14c that store I and P pictures after decoding, that is, decoded image data.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The read-out means which reads the coded-image data of the image of the above-mentioned two or more angle types from the record medium with which it is recorded, the image of two or more angle types being used as coded-image data, with a decode means to decode the above-mentioned coded-image data of the angle type of one of the above-mentioned two or more angle types which carried out reading appearance and which carried out [above-mentioned] reading appearance with the means, and to generate the decode image data of the above-mentioned two or more angle types A storage means for decode to memorize the above-mentioned decode image data of the angle type of one of the above-mentioned two or more angle types generated with the above-mentioned decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, Cutback processing is performed to the above-mentioned decode image data memorized by the above-mentioned storage means for decode. Signal regeneration equipment characterized by having the control means which reads the display image data containing the above-mentioned decode image data which wrote this decode image data that carried out cutback processing in the above-mentioned storage region of the above-mentioned storage means for a display, and was written in this above-mentioned storage region.
[Claim 2] Signal regeneration equipment according to claim 1 characterized by having at least one above-mentioned storage means for decode, decoding the coded-image data in a frame of the above-mentioned coded-image data using the one above-mentioned storage means for decode, and reproducing the image of the above-mentioned two or more angle types currently recorded on the above-mentioned record medium.
[Claim 3] Signal regeneration equipment according to claim 1 characterized by having at least two above-mentioned storage means for decode, decoding the inter-frame forward direction coded-image data of the above-mentioned coded-image data using the two above-mentioned storage means for decode, and reproducing the image of the above-mentioned two or more angle types currently recorded on the above-mentioned record medium.
[Claim 4] Signal regeneration equipment according to claim 1 characterized by having at least three above-mentioned storage means for decode, decoding the inter-frame forward direction coded-image data of the above-mentioned coded-image data using the three above-mentioned storage means for decode, and carrying out hard flow playback of the image of the above-mentioned two or more angle types currently recorded on the above-mentioned record medium.
[Claim 5] The read-out means which reads the above-mentioned coded-image data of the above-mentioned two or more angle types from the record medium with which the image of two or more angle types is recorded as coded-image data, the signal regeneration equipment characterized by having m storage means to memorize the above-mentioned coded-image data which carried out reading appearance, and which carried out [above-mentioned] reading appearance with the means, and a decode means to decode the above-mentioned coded-image data outputted from the m above-mentioned storage means, and to generate decode image data.
[Claim 6] Signal regeneration equipment according to claim 5 characterized by carrying out change ****** of the above-mentioned decode image data of each angle type which was equipped with the m above-mentioned decode means, and was decoded and obtained with each of this m decode means by the transfer switch.
[Claim 7] The above-mentioned decode means is signal regeneration equipment according to claim 5 characterized by switching and inputting the coded-image data of the above-mentioned two or more angle types which have the processing speed of m times as many decode as this, and were outputted from the m above-mentioned storage means.
[Claim 8] Signal regeneration equipment according to claim 5 characterized by mixing and outputting the above-mentioned decode image data of each angle type which was equipped with the m above-mentioned decode means, and was decoded and obtained with each of this m decode means by the mixing circuit.
[Claim 9] Signal regeneration equipment according to claim 8 characterized by having the switch which carries out the output control of the above-mentioned decode image data of each angle type decoded and obtained with each m above-mentioned decode means, and is sent to the above-mentioned mixing circuit.
[Claim 10] The read-out process which reads the coded-image data of the image of the above-mentioned two or more angle types from the record medium with which it is recorded, the image of two or more angle types being used as coded-image data, with the decode process which decodes the above-mentioned coded-image data of the angle type of one of the above-mentioned two or more angle types which carried out reading appearance, and which carried out [above-mentioned] reading appearance at the process, and generates the decode image data of the above-mentioned two or more angle types The decode image data storage process of memorizing the above-mentioned decode image data of the angle type of one of the above-mentioned two or more angle types generated according to the above-mentioned decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, Cutback processing is performed to the above-mentioned decode image data memorized at the above-mentioned decode image-TA storage process. The signal regeneration approach carried out [having the control process which reads the display image data containing the

above-mentioned decode image data which wrote in the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region, and] as the description.
[Claim 11] the signal-regeneration approach which carries out reading appearance and which carries out [having m steps of the storage processes of memorizing the coded-image data above-mentioned / which reads two or more kinds of the above-mentioned coded-image data / which carried out reading appearance, and which carried out / above-mentioned / reading appearance at a process to a process, and the decode process which decode the above-mentioned coded-image data outputted from the m above-mentioned steps of storage processes, and generate decode image data from the record medium with which the image of two or more angle types is recorded as coded-image data and] as the description.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the signal regeneration equipment and the approach of reproducing two or more dynamic images which have the same attribute especially about the signal regeneration equipment and the approach of decoding the coded-image data which constitute a dynamic image, and reproducing a dynamic image.
[0002]
[Description of the Prior Art] Carrying out random access is mentioned as a description common to an optical disk. Taking advantage of this description, as for DVD (digital video disc: DVD-VIDEO) which is an optical disk, the multi-angle-type function, the multi-story function, etc. are incorporated.
[0003] The above-mentioned multi-angle-type function is a function which reproduces the image simultaneously photoed from the camera angle from which plurality differs, for example, is a function which makes refreshable the image of two or more angle types to the image of 1.
[0004] the angle type of the above-mentioned plurality [DVD] — selection — the data made refreshable are constituted as angle iron. Angle iron makes the image data of each angle type a fragment, is formed, in DVD, the so-called interleave structure is used for it, mixes each angle iron, and is recording it on the signal recording surface. DVD is adopting the record structure of such data, and is realizing the above-mentioned multi-angle-type function and the multi-story function.
[0005] A DVD regenerative apparatus can reproduce the above DVDs, for example, and can switch and reproduce them on real time on the image of an angle type to see during playback.
[0006] in addition, seamlessness and the angle iron (henceforth SML_AG_BLK) which it is alike and can be connected about other angle types, and the other angle iron — that is, — non — there is angle iron (henceforth NSML_AGL_BLK) to which that it is only seamless can switch an angle type. [be / when the image of those with two kind and synchronization is switched to the above-mentioned angle iron / namely, / no break]
[0007]
[Problem(s) to be Solved by the Invention] By the way, when above-mentioned SML_AG_BLK is reproduced, the above-mentioned DVD regenerative apparatus will take [after switching an angle type] the time amount of a divisor second to change, although an angle type can be switched seamlessly. That is, as for the above-mentioned DVD regenerative apparatus, playback of another angle type of a flash cannot do an angle type the method of a switch, and the bottom. therefore — when a viewer wants to see the image of other angle types, even if it switches — the switched flash — being concerned — others — the image of an angle type will not be able to be seen but an image to see will be overlooked.
[0008] Furthermore, in playback of above-mentioned SML_AG_BLK, the angle type is restricted to the switch at once at the divisor second. And in all angle types, the subimage data which consist of audio data, title information, etc. are encoded only within the thing concerning the image of the angle type reproduced.
[0009] Moreover, when above-mentioned NSML_AG_BLK is reproduced, once the above-mentioned DVD regenerative apparatus sometimes stops playback the method of a switch, and the bottom, it must change an angle type to another angle type, and must resume playback. Thus, the image with which each angle type is not connected smoothly is not seen for a viewer, but serves as that of ******.
[0010] In addition, in playback of above-mentioned NSML_AG_BLK, another angle type of a flash is [an angle type] reproducible the method of a switch, and the bottom. Many [moreover, / more generally / the location which can switch an angle type / than above-mentioned SML_AG_BLK] furthermore — even if it switches to the image of other angle types — being concerned — others — audio data different from an image and subimage data of an angle type can be decoded.
[0011] When playback of above-mentioned NSML_AG_BLK and NSML_AG_BLK is performed, even if a DVD regenerative apparatus is able to switch an angle type, it cannot switch an angle type to sault MURESU and an instant.
[0012] Moreover, if a viewer can be simultaneously provided with the graphic display of each angle type for example, each angle-type image can always be checked and overlooking of the image by switch of each angle type and the difficulty of seeing can be canceled as mentioned above. Therefore, offer of the equipment which makes it possible to display the image of two or more angle types simultaneously is also desired.
[0013] then — even if it switches the image of two or more angle types which this invention is made in view of the above-mentioned actual condition, and are recorded on the record medium simultaneous — an instant — a sault — it aims at offering the signal regeneration equipment and the approach of seeing a MURESU image.
[0014]
[Means for Solving the Problem] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types, in order to

solve an above-mentioned technical problem A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, It has the control means which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized by the storage means for decode, wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region. By having these, signal regeneration equipment memorizes two or more decode image data to each storage region of the storage means for a display.
[0015] moreover, the signal regeneration equipment concerning this invention is equipped with m storage means to memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means to decode the above-mentioned coded-image data outputted from m storage means, and to generate decode image data in order to solve an above-mentioned technical problem. By having these, signal regeneration equipment is switched simultaneous and decodes the coded-image data of two or more angle types.
[0016] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, It has the control process which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized at the decode image data storage process, wrote in the storage region where the storage process for a display has this decode image data that carried out cutback processing, and was written in this storage region.
[0017] moreover, the signal regeneration approach concerning this invention has m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data, in order to solve an above-mentioned technical problem.
[0018]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing.
[0019] The gestalt of the 1st operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD (digital video disc: DVD-VIDEO) might be reproduced first.

[0020] in addition, I picture and the inter-frame forward direction predicting-coding image which consist of a coded image in a frame as data which DVD is a record medium with which the image compression coding was carried out [the image] by MPEG 2 (Moving Picture Coding Experts Group 2) is recorded, and constitute image data — P picture [from] and B picture which consists of a bidirectional predicting-coding image are recorded.
[0021] Without performing predicting coding, the above-mentioned I picture carries out compression coding, can make one image, is **** coded-image data and generates an image by decode of only data itself. The above-mentioned P picture is coded-image data made from the image in the frame in front of one by carrying out predicting coding. The above-mentioned B picture is coded-image data made from the image in the frame of order by carrying out predicting coding.
[0022] That is, in case it decodes, I picture does not need other coded-image data, and P picture or B picture needs one or two coded-image data for others. Decode of these coded-images data is performed by the data decoder on the frame memory of a DVD regenerative apparatus.
[0023] The DVD regenerative apparatus which reproduces Above DVD divides and constitutes the frame memory 14 used in case it decodes, as shown in drawing 1 to three fields. A frame memory 14 has 1st storage region 14for decode b and 2nd storage region 14c for decode which remember I picture after decode, and P picture, i.e., decode image data, to be storage region 14a for a display which corresponds to the display of nine different images, for example, image [of the angle type of nine directions] **, and forms nine storage regions, and is constituted.
[0024] I picture or P picture is memorized as mentioned above by storage region 14for decode a of the above 1st, and 2nd storage region 14for decode b. For example, when decoding P picture, it decodes using the decode image data of I picture after the decode which memorizes the P picture concerned to either 1st storage region 14for decode b, or 2nd storage region 14c for decode, and is memorized in the decode storage region of another side, or P picture.
[0025] And the decode image data which consists of I picture or P picture decoded in 1st storage region 14for decode a or the 2nd storage region for decode is memorized to the field to which cutback processing was performed and it was divided in the above-mentioned storage region 14a for a display.
[0026] The above-mentioned storage region 14a for a display is a field which memorizes display image data. It divides into nine fields 14a1, 14a2, 14a3, 14a4, 14a5, 14a6, 14a7, 14a8, and 14a9 corresponding to displaying the image of nine ANGU, and it is constituted so that the above-mentioned decode image data by which the above-mentioned cutback processing was performed to each of this field may be memorized.
[0027] In addition, the image data in storage region 14a for a display is reproduced by the monitor by playback of display-image data. Moreover, the mode of the storage region of storage region 14a for a display can be chosen as arbitration. In this case, the above-mentioned decode image data memorized in the storage region formed in the selected mode is reproduced as an image with the above-mentioned display screen data by the part corresponding to the above-mentioned storage region of display screens, such as a monitor.
[0028] For example, in playback by multi-angle-type functional activation, each decode image data which constitutes the image of the angle type of this time of day to each above-mentioned field is memorized, respectively. For example, the decode image data concerning the image of the 1st angle type thru/or the 9th angle type is assigned and memorized to nine fields.

[0029] Thus, by having the constituted frame memory 14, for example, a DVD regenerative apparatus can display the image which decoded the coded-image data which constitute the image of two or more angle types memorized by DVD, these-decoded at once, and was acquired on each display of a monitor.
[0030] Hereafter, the above-mentioned frame memory 14 is explained in more detail using the DVD regenerative apparatus 1 constituted as shown in drawing 2 .
[0031] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium (DVD) 100 as shown in drawing 2 , The RF circuit 3 which the RF signal reproduced by this pickup 2 is supplied, and performs binary-ized processing of this RF signal etc., It has the data decoder 4 which the playback data from the RF circuit 3 are supplied, and carries out decoding, such as an error correction, and the demultiplexer 5 which distributes the playback data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.
[0032] In addition, the above-mentioned main image compressed data is constituted by coded-image data, such as the above-mentioned I picture, P picture, and B picture.
[0033] Moreover, the video decoder 6 which decodes the above-mentioned main image compressed data which the DVD regenerative apparatus 1 was equipped with the above-mentioned frame memory 14, and was outputted from the demultiplexer 5, The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the above-mentioned main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.
[0034] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.
[0035] Moreover, the NTSC signal or PAL signal from the NTSC conversion circuit 9 outputted from the DVD regenerative apparatus 1 is inputted into a monitor 200, and is converted into a video signal.
[0036] In addition, as shown in drawing 14 , it is recorded by Video Object Set (henceforth VOBS), the record medium 100 which this DVD regenerative apparatus 1 reproduces being used as the unit of one work of a film etc.
[0037] Above VOBS consists of two or more Video Object (henceforth VOB). DVD is constituted so that it may become story expansion different the whole above VOB corresponding to the multi-strike-Li function in which he can see one film by two or more story expansions. And VOB is constituted by two or more Cell(s).
[0038] Above Cell serves as units, such as one scene in a film. That is, the combination for every scene of this serves as VOB, and constitutes the above-mentioned multi-strike-Li function etc. by the difference in this combination. And Cell is constituted by two or more Video Object Unit (henceforth VOBU).
[0039] Above VOBU consists of groups of two or more main image compressed data, subimage compressed data, and speech compression data. the main image compressed data, subimage compressed data, or speech compression data is mentioned later — as — the main imagery pack (V_PCK) from a demultiplexer 5, a subimagery pack (SP_PCK), or a voice pack (A_PCK) — ****** — it is-izing and outputted.
[0040] The above-mentioned main image compressed data is data used as the main image of a film, and constitutes the video stream in a DVD format. Moreover, subimage compressed data is data, such as a title, and constitutes the subpicture stream in a DVD format. And speech compression data are data about voice, and constitute the audio stream in a DVD format.
[0041] Here, in DVD, the image data of each angle type are made into the angle iron which it comes to make into a fragment, and interleave structure is used for GOP (Group of Picture) as used in the field of an MPEG 2 method, it mixes angle iron, and is recorded on DVD. For example, in 1VOBU, interleave structure is used for GOP and it is recorded. And as shown in drawing 15 , 1GOP is constituted by I picture, P picture, and B picture, and it is usually constituted so that these I picture, P picture, and B picture may become 15 sheets in total.
[0042] Reading appearance of the data is carried out by the pickup 2 whose DVD regenerative apparatus 1 is equipped with the record medium (DVD) 100 with which data were recorded by the above-mentioned format.
[0043] Pickup 2 irradiates the laser beam from the laser light source included in the pickup 2 concerned at the signal recording surface of a record medium 100, and receives the reflected light reflected by the signal recording surface. Pickup 2 supplies the RF signal reproduced according to the light which received light to the RF circuit 3.
[0044] The RF circuit 3 carries out waveform equalization of this RF signal, binary-ization, etc., and generates playback data, its synchronizing signal, etc. The digital data generated by this RF circuit 3 is supplied to a data decoder 4.
[0045] A data decoder 4 processes a recovery, an error correction, etc. of data based on the playback data generated by the RF circuit 3. The digital data with which the recovery etc. was carried out by the data decoder 4 is supplied to a demultiplexer 5.
[0046] Here, the main image compressed data is contained in the digital data. Therefore, it means that reading appearance of the coded-image data had been carried out by pickup 2, the RF circuit 3, and the data decoder 4 from the record medium 100.
[0047] A demultiplexer 5 divides into various packs, i.e., the main imagery pack, a subimagery pack, or a voice pack the digital data reproduced from the record medium 100 with which decoding of an error correction etc. was performed by the data decoder 4, and outputs each pack concerned to each latter decoder.
[0048] In addition, in order to absorb the processing speed of a demultiplexer 5 and the above-mentioned data decoder 4, the track buffer is prepared between the demultiplexer 5 and the data decoder 4.
[0049] A demultiplexer 5 supplies the main imagery pack which consists of main image compressed data to the video decoder 6, supplies the subimagery pack which consists of a subimage compression pack to the subimage decoder 7, and supplies the voice

pack which consists of a speech compression pack to the audio decoder 8.
[0050] The video decoder 6 performs decode processing of the main image compressed data in the supplied main imagery pack, and generates the main image data expanding-ized by this decode processing. Here, the main image data are decode image data made into decoded I picture, P picture, and B picture. And the video decoder 6 has the above-mentioned frame memory 14, in order to perform decode processing.
[0051] Here, the 9th I picture or I picture, and P picture of an image of a multi-angle type in VOBU are decoded, for example, and the case which performs forward direction playback where it is constituted possible [activation of for example, a multi-angle-type function] by the decode processing which the above-mentioned video decoder 6 performs using the above-mentioned frame memory 14 is explained. In addition, the case where the sequential decode of the I picture I2 in the 1st VOBU and 2nd VOBU is carried out about decode of the above-mentioned I picture is explained. Moreover, the case where the sequential decode of the I picture I2 in 1st VOBU, the P picture P5, and the P picture P8 is carried out about decode processing of the above-mentioned I picture and P picture is explained.
[0052] When decoding only I picture, as shown in drawing 3 (a), the video decoder 6 decodes the I picture I2 of the inside which constitutes the inputted main image compressed data, and memorizes it to 1st storage region 14b for decode of a frame memory 14. The video decoder 6 performs decode of the I picture I2, rewriting on 1st storage region 14b for decode.
[0053] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 3 (b).
[0054] The memorized I picture I2 by which cutback processing was carried out at the above-mentioned storage region 14a for a display is projected on the display by which the monitor 200 was divided through the above-mentioned subimage decoder 7 and the NTSC conversion circuit 9 as an image.
[0055] While the DVD regenerative apparatus 1 projects the generated image by the decoded I picture I2, as shown in drawing 3 (c), it memorizes the I picture I2 currently recorded on 1st storage region 14b for decode of a frame memory 14 in the following I picture and VOBU of ****** 2nd. Here, with having carried out by the I picture I2 of the 1st VOBU, similarly, the video decoder 6 decodes the I picture I2 of this 2nd VOBU, performs cutback processing after that, and copies it to storage region 14a for a display.
[0056] It projects in a monitor 200, the I picture I2 of the 2nd VOBU which cutback processing was carried out and was copied to the above-mentioned storage region 14a for a display being used as the next image of the I picture I2 of the 1st above VOBU. The decode image data (the main image data) decoded and obtained in the video decoder 6 in detail as mentioned above is supplied to the subimage decoder 7.
[0057] The subimage decoder 7 performs decode processing of the subimage compressed data in the supplied subimagery pack, compounds it to the above-mentioned main image data to which the subimage data which carried out this decode processing were supplied from the video decoder 6, and generates image data. That is, the subimage decoder 7 compounds the title data reproduced as subimage data with the above-mentioned main image data. In addition, this subimage decoder 7 outputs the main image data as image data as it is, when there are no subimage data. The subimage decoder 7 supplies the generated image data to the NTSC conversion circuit 9.
[0058] The NTSC conversion circuit 9 changes image data into television signals, such as NTSC and PAL, from digital data. The television signal from the NTSC conversion circuit 9 is projected on a monitor 200 as an image.
[0059] The I picture I2 decoded by the above-mentioned video decoder 6 is contained in the television signal inputted into the monitor 200. Moreover, corresponding to two or more storage regions where storage region 14a for a display of the above-mentioned frame memory 14 was divided, as for a monitor 200, a division indication of the display screen is given nine. Here, a division display follows the division mode of for example, the storage region for a display. Therefore, the image based on the above-mentioned I picture I2 projects on the display of 1 which comes to divide the display screen of a monitor 200.
[0060] In addition, the audio decoder 8 generates the voice data which performed decode processing of the speech compression data in a voice pack, and was elongated. That is, if voice data is compressed by the MPEG 2 method, the audio decoder 8 will carry out expanding processing corresponding to this, and will generate speech compression data. Moreover, besides a format of MPEG 2, if the audio decoder 8 is a format of Linear PCM or DORUBI AC 3, it will perform processing corresponding to this. The audio decoder 8 supplies the generated voice data to the A/D-conversion circuit 10.
[0061] The A/D-conversion circuit 10 changes and outputs the voice data which is digital data to the voice data of an analog. By supplying this output to a loudspeaker etc., a user can view and listen to the image reproduced from the record medium 100.
[0062] A controller 11 performs control of pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10. Moreover, to this controller 11, an actuation input is carried out through the user interface 12 which are a control panel and a remote controller, and each circuit is controlled for it based on this actuation input.
[0063] This controller 11 performs write-in control by the frame memory 14, and read-out control through the video decoder 6. Namely, a controller 11 controls by writing in the storage region of 1 formed for the division display of cutback processing of the decode image data memorized in the storage region for decode of a frame memory 14, and the decode image data concerned of 1 which carried out cutback processing of storage region 14a for a display. And a controller 11 performs read-out control which the decode image data memorized in storage region 14a for a display reads.
[0064] In addition, read-out from display storage region 14a of decode image data is performed by read-out of the display image data of a display storage region 14a unit. The image by the decode image data memorized by up Norikazu's storage image with display-image data corresponding to [200] the above-mentioned storage region projects on the display position corresponding to the storage region concerned of a monitor.
[0065] Therefore, the DVD regenerative apparatus 1 can project simultaneously the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on a monitor 200 by performing similarly the decode and cutback

processing which were performed to I picture of the 9th above-mentioned angle type to the 1st thru/or I picture of the 8th angle type. As shown in drawing 5 R> 5 (a) thru/or drawing 5 (d), a procedure which generates the image (200a) of the 1st angle type, the image (200b) of the 2nd angle type, ..., the image (200i) of the 9th angle type, and the image (200a) of the 1st angle type performs decode of the coded-image data which constitute the image of each angle type in this case.

[0066] In addition, if I picture is only decoded, the frame memory 14 should just be equipped with at least one storage region for decode as mentioned above.

[0067] Moreover, about the case of decode of I picture and P picture, as shown in drawing 4 (a), the inputted I picture I2 decodes the video decoder 6 first, and it is memorized by 1st storage region 14b for decode of a frame memory 14.

[0068] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 4 (b).

[0069] The image generated by the I picture I2 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected on the display of 1 of the monitor 200 corresponding to storage region 14a for a display of a frame memory 14.

[0070] On the other hand, as shown in drawing 4 (c), the video decoder 6 predicts and decodes the P picture P5 inputted into the degree by the I picture I2 after the decode memorized by 1st storage region 14b for decode, and memorizes it to 2nd storage region 14c for decode.

[0071] After memorizing the P picture P5 after decode to 2nd storage region 14c for decode, the video decoder 6 copies the P picture P5 after the decode which performed cutback processing to the decoded P picture P5, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (d).

[0072] The image generated by the P picture P5 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned I picture I2 projected on the display of up Norikazu of a monitor 200.

[0073] In case the P picture P8 is decoded, as shown in drawing 4 (e), the video decoder 6 predicts and decodes the P picture P8 inputted into the degree by the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and memorizes it to 1st storage region 14b for decode.

[0074] After memorizing the P picture P8 after decode to 1st storage region 14b for decode, the video decoder 6 copies the P picture P8 after the decode which performed cutback processing to the decoded P picture P8, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (f).

[0075] The image generated by the P picture P8 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned P picture P5 projected on the display of up Norikazu of a monitor 200.

[0076] Therefore, it means that the image based on I picture and P picture which were decoded had projected on the display of up Norikazu of a monitor 200 one after another.

[0077] The DVD regenerative apparatus 1 can project the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on each display to which the monitor 200 corresponded by performing similarly the above-mentioned decode and the cutback processing which were performed to the 9th I picture and P picture of an angle type to I picture and P picture of the 1st thru/or the 8th angle type.

[0078] The forward direction playback performed by decode of only above-mentioned I picture or I picture, and P picture is applied when performing for example, high-speed playback. Moreover, what is necessary is just to establish the storage region for decode in a frame memory 14 further, if the usual playback is performed.

[0079] Moreover, the DVD regenerative apparatus 1 can also perform hard flow playback, and can also project the image of the 1st thru/or the 9th angle type of this time of day on a monitor 200 as mentioned above. For example, hard flow playback using I picture is performed by decoding I picture in GOP as I picture in the n-1st VOBU(s) is decoded, after decoding I picture in n-th VOBU.

[0080] And the hard flow playback using I picture and P picture decodes I picture by 1st storage region 14b for decode first, and decodes P picture based on it in the 2nd storage region for decode. For example, the I picture I2 is decoded by 1st storage region 14c for decode. Decode processing is performed as the P picture P5 in the same VOBU is decoded by 2nd storage region 14c for decode based on the decoded I picture I2. Hard flow playback is performed by giving an indication to a monitor 200 the order of decode at reverse, namely, reproducing in order of the P picture P5 and the I picture I2.

[0081] next, the DVD regenerative apparatus 1 — hard flow — the case where I picture and P picture which constitute the image of the 9th angle type are decoded about the frame memory 14 constituted refreshable is explained.

[0082] hard flow — as shown in drawing 6 , the frame memory 14 constituted refreshable has 1st decode storage region 14b which remembers the decode image data after decode of I picture or P picture to be storage region 14a for a display which forms nine storage regions, 2nd decode storage region 14c, and 14d of 3rd storage region for decode, and is constituted.

[0083] That is, when applying to hard flow playback, 14d of 3rd storage region for decode is further established in a frame memory 14.

[0084] When carrying out hard flow playback, as shown in drawing 7 (a), the inputted I picture I2 is decoded and it memorizes to 1st storage region 14b for decode of a frame memory 14.

[0085] Then, the P picture P5 inputted into the degree is decoded by prediction using the I picture I2 after the decode memorized by 1st storage region 14b for decode, and the video decoder 6 memorizes it to 2nd storage region 14c for decode, as shown in drawing 7 (b).

[0086] Furthermore, after that, the P picture P8 inputted into the degree is decoded by prediction using the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and the video decoder 6 memorizes it to 14d of 3rd storage region for decode, as shown in drawing 7 (c).

[0087] And each decode copy of data to storage region 14a for a display is performed in order of having processed the above-mentioned decode and reverse. That is, as shown in drawing 7 (d), the P picture P8 after the decode which performed cutback processing to the P picture P8 after the decode memorized first at 14d of 3rd storage region for decode, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display is copied.

[0088] Next, as shown in drawing 7 (e), the P picture P5 after the decode which performed cutback processing to the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.
[0089] And as shown in drawing 7 (f), the I picture I2 after the decode which performed cutback processing to the I picture I2 after the decode memorized by 1st storage region 14b for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.
[0090] As mentioned above, the DVD regenerative apparatus 1 can indicate the image of the P picture P8, the P picture P5, and the I picture I2 by sequential at the display of 1 of the monitor 200 corresponding to the above-mentioned field 14a9 by carrying out the sequential copy of the P picture P8, the P picture P5, and the I picture I2 to the field 14a9 of storage region 14a for a display.
[0091] In addition, the hard flow playback performed by decode of only above-mentioned I picture and P picture is applied when performing for example, high-speed reverse playback. Moreover, what is necessary is just to establish one storage region for decode in a frame memory 14, if the usual hard flow playback is performed.
[0092] As mentioned above, it is explanation in the case of performing hard flow playback using the frame memory 14 constituted so that decode of only I picture or I picture, and P picture might perform, and this frame memory 14.
[0093] The DVD regenerative apparatus 1 is having the frame memory 14 constituted as mentioned above, and it becomes possible in forward direction playback and hard flow playback to display simultaneously the image of two or more angle types which can be set at this time of day.
[0094] The problem of overlooking the image of other switched momentary angle types which were made into the problem in the seamless image switch thereby, for example is also solvable. For example, a viewer can also see simultaneously the image of other angle types [can see a seamless image and] to see.
[0095] in addition — not only an image with the seamless image of the angle type to reproduce — non, you may be a seamless image.
[0096] Moreover, the image of each angle type is constituted as for example, 1VOBU unit, and the image of each angle type of the image of this time of day has an attribute between each VOBU further. That is, the DVD regenerative apparatus 1 has decoded the picture in each VOBU by which matching was carried out [above-mentioned] in playback of the image of each angle type.
[0097] However, it is not limited to this, but it is for example, at the forward direction playback time, and the DVD regenerative apparatus 1 can also decode the picture which constitutes the image of an angle type besides the above of VOBU belonging to the next time of day, when decoding the picture of the image of other angle types. Moreover, it is the DVD regenerative apparatus 1 at the hard flow playback time, and when decoding the picture of the image of other angle types, it can also decode the picture which constitutes the image of an angle type besides the above of VOBU belonging to true time of day.
[0098] Next, the gestalt of the 2nd operation is explained. The gestalt of the 2nd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.
[0099] In addition, DVD consists of data formats which have a multi-angle-type function like the gestalt of the 1st operation of a ****. That is, the MPEG 2 method is used for DVD, and it carries out compression coding as I picture, P picture, and a B picture, and is recording the image. The case where DVD with which the image of two different angle types is recorded hereafter is reproduced is explained.
[0100] As shown in drawing 8 , a DVD regenerative apparatus is equipped with two video decoders, switches the output of the decode image data decoded and obtained by this two video decoder, and is outputting it to the latter circuit.
[0101] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium 100 in detail, The RF circuit 3 which the RF signal reproduced by this pickup 2 is carried out, and performs binary-ized processing for this RF signal, The data decoder 4 which the playback data from the RF circuit 3 etc. are supplied, and carries out decoding, such as an error correction, The track buffer 21 which memorizes the digital data which has the 1st storage region 21a and 2nd storage region 21b, and was outputted from the data decoder 4, It has the demultiplexer 5 which distributes the digital data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.
[0102] Moreover, the 1st video decoder 22 and the 2nd video decoder 23 which decode the above-mentioned main image compressed data with which the DVD regenerative apparatus 1 was outputted from the demultiplexer 5, The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.
[0103] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the 1st video decoder 22, the 2nd video decoder 23, a transfer switch 24, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.

[0104] The data decoder 4 which decodes the playback data by which signal processing was carried out in the pickup 2 which reproduces a RF signal from the above-mentioned record medium 100, the RF circuit 3 which carries out signal processing of this RF signal, and the RF circuit 3 is constituted so that each can usually make processing speed processing [twice]. Here, processing when processing reads a part for the image of one angle type from a record medium 100, for example is usually said.
[0105] Moreover, the above-mentioned demultiplexer 5 is also constituted so that processing speed of data can usually be made into processing [twice]. Thereby, a demultiplexer 5 can perform distribution of the main image compressed data inputted, subimage compressed data, and speech compression data, without differing from the above-mentioned usual processing.
[0106] Hereafter, the component of the above-mentioned DVD regenerative apparatus 1 is explained. In addition, about the part explained with the DVD regenerative apparatus 1 used as the gestalt of the 1st operation, the same number as drawing 2 is attached and the explanation is omitted.
[0107] The DVD regenerative apparatus 1 inputs into a track buffer 21 the coded-image data currently recorded on the record medium 100 through pickup 2, the RF circuit 3, and a data decoder 4.
[0108] The above-mentioned track buffer 21 has two storage regions, the 1st storage region 21a and 2nd storage region 21b. A track buffer 21 memorizes the digital data inputted into each above-mentioned storage region. Here, the digital data contains the main image compressed data divided by the demultiplexer 5, subimage compressed data, and speech compression data, as mentioned above.
[0109] This track buffer 21 is absorbing the difference in the processing speed of the above-mentioned data decoder 4 and a demultiplexer 5. And a track buffer 4 outputs digital data to the demultiplexer 5 concerned by the move instruction from a demultiplexer 5.
[0110] The demultiplexer 5 usually has one twice the processing speed of processing speed, as mentioned above. A demultiplexer 5 incorporates by turns the digital data outputted from each above-mentioned storage region of a track buffer 21, divides the incorporated digital data into the main image compressed data, subimage compressed data, and speech compression data, and outputs it to the 1st video decoder 22 or the 2nd video decoder 23, the subimage decoder 7, and the voice decoder 8.
[0111] The main image compressed data outputted to the 1st video decoder 22 and the 2nd video decoder 23 is the so-called coded-image data, and is data constituted by the so-called I picture, P picture, and B picture. And an output is performed to each above-mentioned video decoder 6 so that it may become for example, 1GOP unit. Moreover, the above-mentioned main image compressed data, subimage compressed data, and speech compression data are supplied to each decoder with which it was pack-ized and the latter part of a demultiplexer 5 was equipped.
[0112] In addition, it has the frame memory equipped with three storage regions for decode for decode of I picture, P picture, and B picture, respectively in the 1st video decoder 22 and the 2nd video decoder 23.
[0113] The 1st video decoder 22 and the 2nd video decoder 23 decode each inputted coded-image data. Inter-frame prediction performs decode processing performed here. The decode image data decoded by this 1st video decoder 22 and the 2nd video decoder 23 is inputted into a transfer switch 24.
[0114] A transfer switch 24 supplies either of the decode image data from the video decoder 22 of the above 1st, or the 2nd video decoder 23 to the latter subimage decoder 7. Switching of a transfer switch 24 is performed by the controller 11.
[0115] For example, the data to which a transfer switch 24 outputs an instruction of a switch during the output of the decode image data from the 1st video decoder 21 by switch actuation a carrier beam case are switched to decode image data from the 2nd video decoder 23. Therefore, the coded-image data decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 are switched by this transfer switch 24 in an instant so that either may be outputted. For example, such switching is performed in the case of a switch of the image of an angle type.
[0116] The decode image data outputted through the above-mentioned transfer switch 24 is displayed on a monitor 200 as an image through the subimage decoder 7 and the NTSC conversion circuit 9.
[0117] Therefore, since it can switch in an instant and can reproduce on the image of other angle types during playback of the image of the angle type of 1, the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation can display the image of other angle types of the switched flash concerned on a monitor 200.
[0118] with this DVD regenerative apparatus 1, a viewer wants to see, when it switches to the image of other angle types — being concerned — others — overlooking the image of an angle type is lost.
[0119] not only an image with the seamless image of an angle type here — non, you may be a seamless image, and regardless of the class of these images, the DVD regenerative apparatus 1 can be switched in an instant, and can be reproduced.
[0120] In addition, even if it switches to the image of an angle type besides the above, about subimage data and voice data, the thing of the data of the image up Norikazu's angle type is used, for example. That is, the subimage data and voice data of an image of an angle type besides the above are not decoded, without being outputted from the above-mentioned demultiplexer 5.
[0121] Moreover, when a difference is in a bit rate by the coded-image data inputted into the coded-image data inputted into the 1st video decoder 22, and the 2nd video decoder 23, The capacity of the opening of the video buffer which is prepared between a demultiplexer 5, the free area of the video buffer which is prepared between the 1st video decoder 22, and which is not illustrated, a demultiplexer 5, and the 2nd video decoder 23 and which is not illustrated For example, what is necessary is to supervise by the controller 11 and just to send out data to a video buffer with an empty field from a demultiplexer 5. In addition, each video buffer is a buffer which absorbs the difference between the processing speed of distribution processing of a demultiplexer 5, and the processing speed of each video decoder decode. That is, if an opening is lost to the buffer of 1 using this buffer, data will be sent out to other buffers and the difference in a bit rate will be absorbed.
[0122] Moreover, it can also have the transfer switch 25 prepared between the video decoder 26 which has the processing speed twice the processing speed of usual in the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation as shown in drawing 9 , and a demultiplexer 5 and the video decoder 26.
[0123] The above-mentioned transfer switch 25 outputs the coded-image data from a demultiplexer 5 to the video decoder 26 for example, per 1GOP. Switching of this transfer switch 25 is performed by the controller 11.

[0124] For example, when an instruction of a switch is issued during the output of the coded-image data corresponding to the image of the angle type of 1, a transfer switch 25 outputs the coded-image data corresponding to the image of other angle types. Therefore, either the coded-image data corresponding to the image of the angle type of 1 or the coded-image data corresponding to the image of other angle types is outputted by switch actuation of this transfer switch 25.
[0125] The above-mentioned video decoder 26 can perform decode processing for the coded-image data from a transfer switch 25 with twice [usual] as many processing speed as this. And the decode compressed data decoded and obtained by the video decoder 26 is displayed on a monitor 200 as an image through the subimage decoder 7, the subimage decoder 7, and the NTSC conversion circuit 9.
[0126] Therefore, it is also an image with the seamless DVD regenerative apparatus 1 to have the video decoder 26 with the above-mentioned transfer switch 25 and decode processing of being twice many as this, and it can switch the angle type of an image in an instant.
[0127] Next, the gestalt of the 3rd operation is explained. The gestalt of this 3rd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.
[0128] The DVD regenerative apparatus used as the gestalt of this 3rd operation is constituted so that the image of two or more angle types may be reproduced simultaneously. Therefore, this DVD regenerative apparatus has the mixing circuit 27 which mixes the decode image data outputted, respectively from the 1st video decoder 23 and the 2nd video decoder 24 into which the main image compressed data from a demultiplexer 5 is inputted, respectively, this 1st video decoder 22, and the 2nd video decoder 23, as shown in drawing 10 .
[0129] That is, the DVD regenerative apparatus 1 used as the gestalt of the 3rd operation takes the configuration which replaces with the transfer switch 24 in the DVD regenerative apparatus 1 used as a gestalt of the 2nd operation, and is equipped with a mixing circuit 27.
[0130] Thus, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it now to a monitor 200.
[0131] For example, the decode image data which constitutes the image of the 1st angle type from the 1st video decoder 22 is outputted. When the decode image data which constitutes the image of the 1st angle type from the 2nd video decoder 23 is outputted, as it is shown in drawing 12 (a) thru/or drawing 12 (b), it is the image (it is shown in drawing 12 (a).) of the 1st angle type. The image of the 2nd angle type (it is shown in drawing 12 (b).) It displays simultaneously (it is shown in drawing 12 (c).). It can carry out.
[0132] In addition, if it is made for the image of the 1st angle type and the image of the 2nd angle type not to lap in the screen of a monitor 200 as shown in drawing 12 (c), the DVD regenerative apparatus 1 can share between the 1st video decoder 23 and the 2nd video decoder 24 the frame memory which consists of three storage regions for decode.
[0133] Moreover, when each of the 1st video decoder 22 and the 2nd video decoder 23 is equipped with a frame memory As shown in drawing 13 (a) thru/or drawing 13 (b), it is the image (it is shown in drawing 13 (a).) of the 1st angle type. The whole display screen of a monitor 200 is used, and it is the image (it is shown in drawing 13 (b).) of the 2nd angle type. It displays using some display screens of a monitor 200 (it is shown in drawing 13 (c).). It can also carry out.
[0134] Moreover, the DVD regenerative apparatus 1 can decode I picture, P picture, and B picture by using the frame memory which consists of three storage regions for decode, and the usual playback is attained.
[0135] Therefore, the DVD regenerative apparatus 1 can usually reproduce the image of an angle type which is simultaneously different two like the time of having two video decoders as mentioned above, and can display the image of an angle type which is different in the two ones concerned which were usually reproduced on a monitor 200.
[0136] Next, the gestalt of the 4th operation is explained. The gestalt of this 4th operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.
[0137] The DVD regenerative apparatus used as the gestalt of this 4th operation is constituted so that the image of two or more angle types can be reproduced simultaneously and the image of the angle type under playback can be switched seamlessly and momentarily. Therefore, the 1st video decoder 22 and the 2nd video decoder 23 into which the main image compressed data from a demultiplexer 5 is inputted, respectively as this DVD regenerative apparatus is shown in drawing 11 , The mixing circuit 27 which mixes the decode image data outputted, respectively from this 1st video decoder 22 and the 2nd video decoder 23, The switch 28 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 1st video decoder 22, It has the switch 29 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 2nd video decoder 23.
[0138] Thus, where a switch 28 and a switch 29 are turned ON, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it to a monitor 200. For example, the mixed image can supply the DVD regenerative apparatus 1 to a monitor 200 so that it may be displayed on drawing 12 (c) and drawing 13 (c).
[0139] Furthermore, by actuation of ON/OFF of a switch 28 and a switch 29, the DVD regenerative apparatus 1 can switch the 1st video decoder 22 and the 2nd video decoder 23, and can also decode coded-image data. In this case, when a switch 28 is ON, a switch 29 is turned OFF, and a switch 29 is turned ON when a switch 28 is OFF.
[0140] For example, when an instruction of a switch is issued during the output of the decode image data which constitutes the image of the angle type of the 1st video decoder 22-1, the decode image data which constitutes the image of other angle types from the 2nd video decoder 23 can be outputted by turning OFF a switch 28 and turning ON a switch 29 by one side. That is, either of the image ********** decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 is switched in an instant, and is outputted.

[0141] Therefore, during playback of the image of the angle type of 1, it can switch in an instant, and can reproduce on the image of other angle types, and the DVD regenerative apparatus 1 can display the image of the angle type of the switched others concerned on a monitor 200.
[0142] Even if the DVD regenerative apparatus 1 which serve as a gestalt of the 4th operation from the above thing are reproducing two or more angle types simultaneously and a seamless image, they can also be switched to the image of other angle types in an instant.
[0143] With this DVD regenerative apparatus 1, the image of other angle types can be seen simultaneously and a viewer loses overlooking the image of an angle type to see when it switches to see other angle types by switch actuation further.
[0144] In addition, although playback of DVD with which the image of two angle types was recorded in the DVD regenerative apparatus 1 used as the gestalt of the 2nd thru/or the 4th operation was mentioned as the example and explained, three or more, for example, DVD with which the image of a two or more m angle type is recorded, are also reproducible. In this case, the DVD regenerative apparatus 1 constitutes each part so that it may become one m times the processing speed [m pieces and] of this about two pieces and twice as many processing speed as this, respectively.
[0145]
[Effect of the Invention] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, Cutback processing is performed to the decode image data memorized by the storage means for decode. By having the control means which reads the display image data containing the decode image data which wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.
[0146] therefore, the above-mentioned signal regeneration equipment — for example, — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.
[0147] moreover, the signal-regeneration equipment concerning this invention can decode two or more coded-image data, and can switch them in an instant, or can reproduce the image of two or more angle types simultaneously by having m storage means memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means decode the above-mentioned coded-image data outputted from m storage means, and generate decode image data.
[0148] And the above-mentioned signal regeneration equipment can be switched to the image of other angle types also, for example in playback of a seamless image in an instant.
[0149] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, Cutback processing is performed to the above-mentioned decode image data memorized at the decode image data storage process. By having the control process which reads the display image data containing the above-mentioned decode image data which wrote in the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.
[0150] therefore — according to the above-mentioned signal regeneration approach — for example — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.
[0151] Moreover, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem by having m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data Two or more coded-image data can be decoded, and it can switch in an instant, or the image of two or more angle types can be reproduced simultaneously.
[0152] And according to the above-mentioned signal regeneration approach, also, for example in playback of a seamless image, it can switch to the image of other angle types in an instant.

[Translation done.]

* NOTICES *

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the signal regeneration equipment and the approach of reproducing two or more dynamic images which have the same attribute especially about the signal regeneration equipment and the approach of decoding the coded-image data which constitute a dynamic image, and reproducing a dynamic image.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Carrying out random access is mentioned as a description common to an optical disk. Taking advantage of this description, as for DVD (digital video disc: DVD-VIDEO) which is an optical disk, the multi-angle-type function, the multi-story function, etc. are incorporated.
[0003] The above-mentioned multi-angle-type function is a function which reproduces the image simultaneously photoed from the camera angle from which plurality differs, for example, is a function which makes refreshable the image of two or more angle types to the image of 1.
[0004] the angle type of the above-mentioned plurality [DVD] — selection — the data made refreshable are constituted as angle iron. Angle iron makes the image data of each angle type a fragment, is formed, in DVD, the so-called interleave structure is used for it, mixes each angle iron, and is recording it on the signal recording surface. DVD is adopting the record structure of such data, and is realizing the above-mentioned multi-angle-type function and the multi-story function.
[0005] A DVD regenerative apparatus can reproduce the above DVDs, for example, and can switch and reproduce them on real time on the image of an angle type to see during playback.
[0006] in addition, seamlessness and the angle iron (henceforth SML_AG_BLK) which it is alike and can be connected about other angle types, and the other angle iron — that is, — non — there is angle iron (henceforth NSML_AGL_BLK) to which that it is only seamless can switch an angle type. [be / when the image of those with two kind and synchronization is switched to the above-mentioned angle iron / namely, / no break]

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, Cutback processing is performed to the decode image data memorized by the storage means for decode. By having the control means which reads the display image data containing the decode image data which wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.
[0146] therefore, the above-mentioned signal regeneration equipment — for example, — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.
[0147] moreover, the signal-regeneration equipment concerning this invention can decode two or more coded-image data, and can switch them in an instant, or can reproduce the image of two or more angle types simultaneously by having m storage means memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means decode the above-mentioned coded-image data outputted from m storage means, and generate decode image data.
[0148] And the above-mentioned signal regeneration equipment can be switched to the image of other angle types also, for example in playback of a seamless image in an instant.
[0149] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, Cutback processing is performed to the above-mentioned decode image data memorized at the decode image data storage process. By having the control process which reads the display image data containing the above-mentioned decode image data which wrote in the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.
[0150] therefore — according to the above-mentioned signal regeneration approach — for example — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.
[0151] Moreover, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem by having m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data Two or more coded-image data can be decoded, and it can switch in an instant, or the image of two or more angle types can be reproduced simultaneously.
[0152] And according to the above-mentioned signal regeneration approach, also, for example in playback of a seamless image, it can switch to the image of other angle types in an instant.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, when above-mentioned SML_AG_BLK is reproduced, the above-mentioned DVD regenerative apparatus will take [after switching an angle type] the time amount of a divisor second to change, although an angle type can be switched seamlessly. That is, as for the above-mentioned DVD regenerative apparatus, playback of another angle type of a flash cannot do an angle type the method of a switch, and the bottom. therefore — when a viewer wants to see the image of other angle types, even if it switches — the switched flash — being concerned — others — the image of an angle type will not be able to be seen but an image to see will be overlooked.
[0008] Furthermore, in playback of above-mentioned SML_AG_BLK, the angle type is restricted to the switch at once at the divisor second. And in all angle types, the subimage data which consist of audio data, title information, etc. are encoded only within the thing concerning the image of the angle type reproduced.
[0009] Moreover, when above-mentioned NSML_AG_BLK is reproduced, once the above-mentioned DVD regenerative apparatus sometimes stops playback the method of a switch, and the bottom, it must change an angle type to another angle type, and must resume playback. Thus, the image with which each angle type is not connected smoothly is not seen for a viewer, but serves as that of ******.
[0010] In addition, in playback of above-mentioned NSML_AG_BLK, another angle type of a flash is [an angle type] reproducible the method of a switch, and the bottom. Many [moreover, / more generally / the location which can switch an angle type / than above-mentioned SML_AG_BLK] furthermore — even if it switches to the image of other angle types — being concerned — others — audio data different from an image and subimage data of an angle type can be decoded.
[0011] When playback of above-mentioned NSML_AG_BLK and NSML_AG_BLK is performed, even if a DVD regenerative apparatus is able to switch an angle type, it cannot switch an angle type to sault MURESU and an instant.
[0012] Moreover, if a viewer can be simultaneously provided with the graphic display of each angle type for example, each angle-type image can always be checked and overlooking of the image by switch of each angle type and the difficulty of seeing can be canceled as mentioned above. Therefore, offer of the equipment which makes it possible to display the image of two or more angle types simultaneously is also desired.
[0013] then — even if it switches the image of two or more angle types which this invention is made in view of the above-mentioned actual condition, and are recorded on the record medium simultaneous — an instant — a sault — it aims at offering the signal regeneration equipment and the approach of seeing a MURESU image.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types, in order to solve an above-mentioned technical problem A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, It has the control means which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized by the storage means for decode, wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region. By having these, signal regeneration equipment memorizes two or more decode image data to each storage region of the storage means for a display.
[0015] moreover, the signal regeneration equipment concerning this invention is equipped with m storage means to memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means to decode the above-mentioned coded-image data outputted from m storage means, and to generate decode image data in order to solve an above-mentioned technical problem. By having these, signal regeneration equipment is switched simultaneous and decodes the coded-image data of two or more angle types.
[0016] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, It has the control process which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized at the decode image data storage process, wrote in the storage region where the storage process for a display has this decode image data that carried out cutback processing, and was written in this storage region.
[0017] moreover, the signal regeneration approach concerning this invention has m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data, in order to solve an above-mentioned technical problem.
[0018]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing.
[0019] The gestalt of the 1st operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD (digital video disc: DVD-VIDEO) might be reproduced first.

[0020] in addition, I picture and the inter-frame forward direction predicting-coding image which consist of a coded image in a frame as data which DVD is a record medium with which the image compression coding was carried out [the image] by MPEG 2 (Moving Picture Coding Experts Group 2) is recorded, and constitute image data — P picture [from] and B picture which consists of a bidirectional predicting-coding image are recorded.
[0021] Without performing predicting coding, the above-mentioned I picture carries out compression coding, can make one image, is **** coded-image data and generates an image by decode of only data itself. The above-mentioned P picture is coded-image data made from the image in the frame in front of one by carrying out predicting coding. The above-mentioned B picture is coded-image data made from the image in the frame of order by carrying out predicting coding.
[0022] That is, in case it decodes, I picture does not need other coded-image data, and P picture or B picture needs one or two coded-image data for others. Decode of these coded-images data is performed by the data decoder on the frame memory of a DVD regenerative apparatus.
[0023] The DVD regenerative apparatus which reproduces Above DVD divides and constitutes the frame memory 14 used in case it decodes, as shown in drawing 1 to three fields. A frame memory 14 has 1st storage region 14for decode b and 2nd storage region 14c for decode which remember I picture after decode, and P picture, i.e., decode image data, to be storage region 14a for a display which corresponds to the display of nine different images, for example, image [of the angle type of nine directions] **, and forms nine storage regions, and is constituted.
[0024] I picture or P picture is memorized as mentioned above by storage region 14for decode a of the above 1st, and 2nd storage region 14for decode b. For example, when decoding P picture, it decodes using the decode image data of I picture after the decode which memorizes the P picture concerned to either 1st storage region 14for decode b, or 2nd storage region 14c for decode, and is memorized in the decode storage region of another side, or P picture.

[0025] And the decode image data which consists of I picture or P picture decoded in 1st storage region 14for decode a or the 2nd storage region for decode is memorized to the field to which cutback processing was performed and it was divided in the above-mentioned storage region 14a for a display.
[0026] The above-mentioned storage region 14a for a display is a field which memorizes display image data. It divides into nine fields 14a1, 14a2, 14a3, 14a4, 14a5, 14a6, 14a7, 14a8, and 14a9 corresponding to displaying the image of nine ANGU, and it is constituted so that the above-mentioned decode image data by which the above-mentioned cutback processing was performed to each of this field may be memorized.
[0027] In addition, the image data in storage region 14a for a display is reproduced by the monitor by playback of display-image data. Moreover, the mode of the storage region of storage region 14a for a display can be chosen as arbitration. In this case, the above-mentioned decode image data memorized in the storage region formed in the selected mode is reproduced as an image with the above-mentioned display screen data by the part corresponding to the above-mentioned storage region of display screens, such as a monitor.
[0028] For example, in playback by multi-angle-type functional activation, each decode image data which constitutes the image of the angle type of this time of day to each above-mentioned field is memorized, respectively. For example, the decode image data concerning the image of the 1st angle type thru/or the 9th angle type is assigned and memorized to nine fields.
[0029] Thus, by having the constituted frame memory 14, for example, a DVD regenerative apparatus can display the image which decoded the coded-image data which constitute the image of two or more angle types memorized by DVD, these-decoded at once, and was acquired on each display of a monitor.
[0030] Hereafter, the above-mentioned frame memory 14 is explained in more detail using the DVD regenerative apparatus 1 constituted as shown in drawing 2 .
[0031] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium (DVD) 100 as shown in drawing 2 , The RF circuit 3 which the RF signal reproduced by this pickup 2 is supplied, and performs binary-ized processing of this RF signal etc., It has the data decoder 4 which the playback data from the RF circuit 3 are supplied, and carries out decoding, such as an error correction, and the demultiplexer 5 which distributes the playback data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.
[0032] In addition, the above-mentioned main image compressed data is constituted by coded-image data, such as the above-mentioned I picture, P picture, and B picture.
[0033] Moreover, the video decoder 6 which decodes the above-mentioned main image compressed data which the DVD regenerative apparatus 1 was equipped with the above-mentioned frame memory 14, and was outputted from the demultiplexer 5, The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the above-mentioned main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.
[0034] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.
[0035] Moreover, the NTSC signal or PAL signal from the NTSC conversion circuit 9 outputted from the DVD regenerative apparatus 1 is inputted into a monitor 200, and is converted into a video signal.
[0036] In addition, as shown in drawing 14 , it is recorded by Video Object Set (henceforth VOBS), the record medium 100 which this DVD regenerative apparatus 1 reproduces being used as the unit of one work of a film etc.
[0037] Above VOBS consists of two or more Video Object (henceforth VOB). DVD is constituted so that it may become story expansion different the whole above VOB corresponding to the multi-strike-Li function in which he can see one film by two or more story expansions. And VOB is constituted by two or more Cell(s).
[0038] Above Cell serves as units, such as one scene in a film. That is, the combination for every scene of this serves as VOB, and constitutes the above-mentioned multi-strike-Li function etc. by the difference in this combination. And Cell is constituted by two or more Video Object Unit (henceforth VOBU).
[0039] Above VOBU consists of groups of two or more main image compressed data, subimage compressed data, and speech compression data. the main image compressed data, subimage compressed data, or speech compression data is mentioned later — as — the main imagery pack (V_PCK) from a demultiplexer 5, a subimagery pack (SP_PCK), or a voice pack (A_PCK) — ****** — it is-izing and outputted.
[0040] The above-mentioned main image compressed data is data used as the main image of a film, and constitutes the video stream in a DVD format. Moreover, subimage compressed data is data, such as a title, and constitutes the subpicture stream in a DVD format. And speech compression data are data about voice, and constitute the audio stream in a DVD format.
[0041] Here, in DVD, the image data of each angle type are made into the angle iron which it comes to make into a fragment, and interleave structure is used for GOP (Group of Picture) as used in the field of an MPEG 2 method, it mixes angle iron, and is recorded on DVD. For example, in 1VOBU, interleave structure is used for GOP and it is recorded. And as shown in drawing 15 , 1GOP is constituted by I picture, P picture, and B picture, and it is usually constituted so that these I picture, P picture, and B picture may become 15 sheets in total.
[0042] Reading appearance of the data is carried out by the pickup 2 whose DVD regenerative apparatus 1 is equipped with the record medium (DVD) 100 with which data were recorded by the above-mentioned format.
[0043] Pickup 2 irradiates the laser beam from the laser light source included in the pickup 2 concerned at the signal recording

surface of a record medium 100, and receives the reflected light reflected by the signal recording surface. Pickup 2 supplies the RF signal reproduced according to the light which received light to the RF circuit 3.
[0044] The RF circuit 3 carries out waveform equalization of this RF signal, binary-ization, etc., and generates playback data, its synchronizing signal, etc. The digital data generated by this RF circuit 3 is supplied to a data decoder 4.
[0045] A data decoder 4 processes a recovery, an error correction, etc. of data based on the playback data generated by the RF circuit 3. The digital data with which the recovery etc. was carried out by the data decoder 4 is supplied to a demultiplexer 5.
[0046] Here, the main image compressed data is contained in the digital data. Therefore, it means that reading appearance of the coded-image data had been carried out by pickup 2, the RF circuit 3, and the data decoder 4 from the record medium 100.
[0047] A demultiplexer 5 divides into various packs, i.e., the main imagery pack, a subimagery pack, or a voice pack the digital data reproduced from the record medium 100 with which decoding of an error correction etc. was performed by the data decoder 4, and outputs each pack concerned to each latter decoder.
[0048] In addition, in order to absorb the processing speed of a demultiplexer 5 and the above-mentioned data decoder 4, the track buffer is prepared between the demultiplexer 5 and the data decoder 4.
[0049] A demultiplexer 5 supplies the main imagery pack which consists of main image compressed data to the video decoder 6, supplies the subimagery pack which consists of a subimage compression pack to the subimage decoder 7, and supplies the voice pack which consists of a speech compression pack to the audio decoder 8.
[0050] The video decoder 6 performs decode processing of the main image compressed data in the supplied main imagery pack, and generates the main image data expanding-ized by this decode processing. Here, the main image data are decode image data made into decoded I picture, P picture, and B picture. And the video decoder 6 has the above-mentioned frame memory 14, in order to perform decode processing.
[0051] Here, the 9th I picture or I picture, and P picture of an image of a multi-angle type in VOBU are decoded, for example, and the case which performs forward direction playback where it is constituted possible [activation of for example, a multi-angle-type function] by the decode processing which the above-mentioned video decoder 6 performs using the above-mentioned frame memory 14 is explained. In addition, the case where the sequential decode of the I picture I2 in the 1st VOBU and 2nd VOBU is carried out about decode of the above-mentioned I picture is explained. Moreover, the case where the sequential decode of the I picture I2 in 1st VOBU, the P picture P5, and the P picture P8 is carried out about decode processing of the above-mentioned I picture and P picture is explained.
[0052] When decoding only I picture, as shown in drawing 3 (a), the video decoder 6 decodes the I picture I2 of the inside which constitutes the inputted main image compressed data, and memorizes it to 1st storage region 14b for decode of a frame memory 14. The video decoder 6 performs decode of the I picture I2, rewriting on 1st storage region 14b for decode.
[0053] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 3 (b).
[0054] The memorized I picture I2 by which cutback processing was carried out at the above-mentioned storage region 14a for a display is projected on the display by which the monitor 200 was divided through the above-mentioned subimage decoder 7 and the NTSC conversion circuit 9 as an image.
[0055] While the DVD regenerative apparatus 1 projects the generated image by the decoded I picture I2, as shown in drawing 3 (c), it memorizes the I picture I2 currently recorded on 1st storage region 14b for decode of a frame memory 14 in the following I picture and VOBU of ****** 2nd. Here, with having carried out by the I picture I2 of the 1st VOBU, similarly, the video decoder 6 decodes the I picture I2 of this 2nd VOBU, performs cutback processing after that, and copies it to storage region 14a for a display.
[0056] It projects in a monitor 200, the I picture I2 of the 2nd VOBU which cutback processing was carried out and was copied to the above-mentioned storage region 14a for a display being used as the next image of the I picture I2 of the 1st above VOBU. The decode image data (the main image data) decoded and obtained in the video decoder 6 in detail as mentioned above is supplied to the subimage decoder 7.
[0057] The subimage decoder 7 performs decode processing of the subimage compressed data in the supplied subimagery pack, compounds it to the above-mentioned main image data to which the subimage data which carried out this decode processing were supplied from the video decoder 6, and generates image data. That is, the subimage decoder 7 compounds the title data reproduced as subimage data with the above-mentioned main image data. In addition, this subimage decoder 7 outputs the main image data as image data as it is, when there are no subimage data. The subimage decoder 7 supplies the generated image data to the NTSC conversion circuit 9.
[0058] The NTSC conversion circuit 9 changes image data into television signals, such as NTSC and PAL, from digital data. The television signal from the NTSC conversion circuit 9 is projected on a monitor 200 as an image.
[0059] The I picture I2 decoded by the above-mentioned video decoder 6 is contained in the television signal inputted into the monitor 200. Moreover, corresponding to two or more storage regions where storage region 14a for a display of the above-mentioned frame memory 14 was divided, as for a monitor 200, a division indication of the display screen is given nine. Here, a division display follows the division mode of for example, the storage region for a display. Therefore, the image based on the above-mentioned I picture I2 projects on the display of 1 which comes to divide the display screen of a monitor 200.
[0060] In addition, the audio decoder 8 generates the voice data which performed decode processing of the speech compression data in a voice pack, and was elongated. That is, if voice data is compressed by the MPEG 2 method, the audio decoder 8 will carry out expanding processing corresponding to this, and will generate speech compression data. Moreover, besides a format of MPEG 2, if the audio decoder 8 is a format of Linear PCM or DORUBI AC 3, it will perform processing corresponding to this. The audio decoder 8 supplies the generated voice data to the A/D-conversion circuit 10.
[0061] The A/D-conversion circuit 10 changes and outputs the voice data which is digital data to the voice data of an analog. By supplying this output to a loudspeaker etc., a user can view and listen to the image reproduced from the record medium 100.

[0062] A controller 11 performs control of pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10. Moreover, to this controller 11, an actuation input is carried out through the user interface 12 which are a control panel and a remote controller, and each circuit is controlled for it based on this actuation input.
[0063] This controller 11 performs write-in control by the frame memory 14, and read-out control through the video decoder 6. Namely, a controller 11 controls by writing in the storage region of 1 formed for the division display of cutback processing of the decode image data memorized in the storage region for decode of a frame memory 14, and the decode image data concerned of 1 which carried out cutback processing of storage region 14a for a display. And a controller 11 performs read-out control which the decode image data memorized in storage region 14a for a display reads.
[0064] In addition, read-out from display storage region 14a of decode image data is performed by read-out of the display image data of a display storage region 14a unit. The image by the decode image data memorized by up Norikazu's storage image with display-image data corresponding to [200] the above-mentioned storage region projects on the display position corresponding to the storage region concerned of a monitor.
[0065] Therefore, the DVD regenerative apparatus 1 can project simultaneously the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on a monitor 200 by performing similarly the decode and cutback processing which were performed to I picture of the 9th above-mentioned angle type to the 1st thru/or I picture of the 8th angle type. As shown in drawing 5 R> 5 (a) thru/or drawing 5 (d), a procedure which generates the image (200a) of the 1st angle type, the image (200b) of the 2nd angle type, ..., the image (200i) of the 9th angle type, and the image (200a) of the 1st angle type performs decode of the coded-image data which constitute the image of each angle type in this case.
[0066] In addition, if I picture is only decoded, the frame memory 14 should just be equipped with at least one storage region for decode as mentioned above.
[0067] Moreover, about the case of decode of I picture and P picture, as shown in drawing 4 (a), the inputted I picture I2 decodes the video decoder 6 first, and it is memorized by 1st storage region 14b for decode of a frame memory 14.
[0068] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 4 (b).
[0069] The image generated by the I picture I2 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected on the display of 1 of the monitor 200 corresponding to storage region 14a for a display of a frame memory 14.
[0070] On the other hand, as shown in drawing 4 (c), the video decoder 6 predicts and decodes the P picture P5 inputted into the degree by the I picture I2 after the decode memorized by 1st storage region 14b for decode, and memorizes it to 2nd storage region 14c for decode.
[0071] After memorizing the P picture P5 after decode to 2nd storage region 14c for decode, the video decoder 6 copies the P picture P5 after the decode which performed cutback processing to the decoded P picture P5, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (d).
[0072] The image generated by the P picture P5 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned I picture I2 projected on the display of up Norikazu of a monitor 200.
[0073] In case the P picture P8 is decoded, as shown in drawing 4 (e), the video decoder 6 predicts and decodes the P picture P8 inputted into the degree by the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and memorizes it to 1st storage region 14b for decode.
[0074] After memorizing the P picture P8 after decode to 1st storage region 14b for decode, the video decoder 6 copies the P picture P8 after the decode which performed cutback processing to the decoded P picture P8, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (f).
[0075] The image generated by the P picture P8 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned P picture P5 projected on the display of up Norikazu of a monitor 200.
[0076] Therefore, it means that the image based on I picture and P picture which were decoded had projected on the display of up Norikazu of a monitor 200 one after another.
[0077] The DVD regenerative apparatus 1 can project the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on each display to which the monitor 200 corresponded by performing similarly the above-mentioned decode and the cutback processing which were performed to the 9th I picture and P picture of an angle type to I picture and P picture of the 1st thru/or the 8th angle type.
[0078] The forward direction playback performed by decode of only above-mentioned I picture or I picture, and P picture is applied when performing for example, high-speed playback. Moreover, what is necessary is just to establish the storage region for decode in a frame memory 14 further, if the usual playback is performed.
[0079] Moreover, the DVD regenerative apparatus 1 can also perform hard flow playback, and can also project the image of the 1st thru/or the 9th angle type of this time of day on a monitor 200 as mentioned above. For example, hard flow playback using I picture is performed by decoding I picture in GOP as I picture in the n-1st VOBU(s) is decoded, after decoding I picture in n-th VOBU.
[0080] And the hard flow playback using I picture and P picture decodes I picture by 1st storage region 14b for decode first, and decodes P picture based on it in the 2nd storage region for decode. For example, the I picture I2 is decoded by 1st storage region 14c for decode. Decode processing is performed as the P picture P5 in the same VOBU is decoded by 2nd storage region 14c for decode based on the decoded I picture I2. Hard flow playback is performed by giving an indication to a monitor 200 the order of decode at reverse, namely, reproducing in order of the P picture P5 and the I picture I2.

[0081] next, the DVD regenerative apparatus 1 — hard flow — the case where I picture and P picture which constitute the image of the 9th angle type are decoded about the frame memory 14 constituted refreshable is explained.
[0082] hard flow — as shown in drawing 6 , the frame memory 14 constituted refreshable has 1st decode storage region 14b which remembers the decode image data after decode of I picture or P picture to be storage region 14a for a display which forms nine storage regions, 2nd decode storage region 14c, and 14d of 3rd storage region for decode, and is constituted.
[0083] That is, when applying to hard flow playback, 14d of 3rd storage region for decode is further established in a frame memory 14.
[0084] When carrying out hard flow playback, as shown in drawing 7 (a), the inputted I picture I2 is decoded and it memorizes to 1st storage region 14b for decode of a frame memory 14.
[0085] Then, the P picture P5 inputted into the degree is decoded by prediction using the I picture I2 after the decode memorized by 1st storage region 14b for decode, and the video decoder 6 memorizes it to 2nd storage region 14c for decode, as shown in drawing 7 (b).
[0086] Furthermore, after that, the P picture P8 inputted into the degree is decoded by prediction using the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and the video decoder 6 memorizes it to 14d of 3rd storage region for decode, as shown in drawing 7 (c).
[0087] And each decode copy of data to storage region 14a for a display is performed in order of having processed the above-mentioned decode and reverse. That is, as shown in drawing 7 (d), the P picture P8 after the decode which performed cutback processing to the P picture P8 after the decode memorized first at 14d of 3rd storage region for decode, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display is copied.

[0088] Next, as shown in drawing 7 (e), the P picture P5 after the decode which performed cutback processing to the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.
[0089] And as shown in drawing 7 (f), the I picture I2 after the decode which performed cutback processing to the I picture I2 after the decode memorized by 1st storage region 14b for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.
[0090] As mentioned above, the DVD regenerative apparatus 1 can indicate the image of the P picture P8, the P picture P5, and the I picture I2 by sequential at the display of 1 of the monitor 200 corresponding to the above-mentioned field 14a9 by carrying out the sequential copy of the P picture P8, the P picture P5, and the I picture I2 to the field 14a9 of storage region 14a for a display.
[0091] In addition, the hard flow playback performed by decode of only above-mentioned I picture and P picture is applied when performing for example, high-speed reverse playback. Moreover, what is necessary is just to establish one storage region for decode in a frame memory 14, if the usual hard flow playback is performed.
[0092] As mentioned above, it is explanation in the case of performing hard flow playback using the frame memory 14 constituted so that decode of only I picture or I picture, and P picture might perform, and this frame memory 14.
[0093] The DVD regenerative apparatus 1 is having the frame memory 14 constituted as mentioned above, and it becomes possible in forward direction playback and hard flow playback to display simultaneously the image of two or more angle types which can be set at this time of day.
[0094] The problem of overlooking the image of other switched momentary angle types which were made into the problem in the seamless image switch thereby, for example is also solvable. For example, a viewer can also see simultaneously the image of other angle types [can see a seamless image and] to see.
[0095] in addition — not only an image with the seamless image of the angle type to reproduce — non, you may be a seamless image.
[0096] Moreover, the image of each angle type is constituted as for example, 1VOBU unit, and the image of each angle type of the image of this time of day has an attribute between each VOBU further. That is, the DVD regenerative apparatus 1 has decoded the picture in each VOBU by which matching was carried out [above-mentioned] in playback of the image of each angle type.
[0097] However, it is not limited to this, but it is for example, at the forward direction playback time, and the DVD regenerative apparatus 1 can also decode the picture which constitutes the image of an angle type besides the above of VOBU belonging to the next time of day, when decoding the picture of the image of other angle types. Moreover, it is the DVD regenerative apparatus 1 at the hard flow playback time, and when decoding the picture of the image of other angle types, it can also decode the picture which constitutes the image of an angle type besides the above of VOBU belonging to true time of day.
[0098] Next, the gestalt of the 2nd operation is explained. The gestalt of the 2nd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.
[0099] In addition, DVD consists of data formats which have a multi-angle-type function like the gestalt of the 1st operation of a ****. That is, the MPEG 2 method is used for DVD, and it carries out compression coding as I picture, P picture, and a B picture, and is recording the image. The case where DVD with which the image of two different angle types is recorded hereafter is reproduced is explained.
[0100] As shown in drawing 8 , a DVD regenerative apparatus is equipped with two video decoders, switches the output of the decode image data decoded and obtained by this two video decoder, and is outputting it to the latter circuit.
[0101] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium 100 in detail, The RF circuit 3 which the RF signal reproduced by this pickup 2 is carried out, and performs binary-ized processing for this RF signal, The data decoder 4 which the playback data from the RF circuit 3 etc. are supplied, and carries out decoding, such as an error correction, The track buffer 21 which memorizes the digital data which has the 1st storage region 21a and 2nd storage region

21b, and was outputted from the data decoder 4, It has the demultiplexer 5 which distributes the digital data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.
[0102] Moreover, the 1st video decoder 22 and the 2nd video decoder 23 which decode the above-mentioned main image compressed data with which the DVD regenerative apparatus 1 was outputted from the demultiplexer 5, The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.
[0103] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the 1st video decoder 22, the 2nd video decoder 23, a transfer switch 24, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.
[0104] The data decoder 4 which decodes the playback data by which signal processing was carried out in the pickup 2 which reproduces a RF signal from the above-mentioned record medium 100, the RF circuit 3 which carries out signal processing of this RF signal, and the RF circuit 3 is constituted so that each can usually make processing speed processing [twice]. Here, processing when processing reads a part for the image of one angle type from a record medium 100, for example is usually said.
[0105] Moreover, the above-mentioned demultiplexer 5 is also constituted so that processing speed of data can usually be made into processing [twice]. Thereby, a demultiplexer 5 can perform distribution of the main image compressed data inputted, subimage compressed data, and speech compression data, without differing from the above-mentioned usual processing.
[0106] Hereafter, the component of the above-mentioned DVD regenerative apparatus 1 is explained. In addition, about the part explained with the DVD regenerative apparatus 1 used as the gestalt of the 1st operation, the same number as drawing 2 is attached and the explanation is omitted.
[0107] The DVD regenerative apparatus 1 inputs into a track buffer 21 the coded-image data currently recorded on the record medium 100 through pickup 2, the RF circuit 3, and a data decoder 4.
[0108] The above-mentioned track buffer 21 has two storage regions, the 1st storage region 21a and 2nd storage region 21b. A track buffer 21 memorizes the digital data inputted into each above-mentioned storage region. Here, the digital data contains the main image compressed data divided by the demultiplexer 5, subimage compressed data, and speech compression data, as mentioned above.
[0109] This track buffer 21 is absorbing the difference in the processing speed of the above-mentioned data decoder 4 and a demultiplexer 5. And a track buffer 4 outputs digital data to the demultiplexer 5 concerned by the move instruction from a demultiplexer 5.
[0110] The demultiplexer 5 usually has one twice the processing speed of processing speed, as mentioned above. A demultiplexer 5 incorporates by turns the digital data outputted from each above-mentioned storage region of a track buffer 21, divides the incorporated digital data into the main image compressed data, subimage compressed data, and speech compression data, and outputs it to the 1st video decoder 22 or the 2nd video decoder 23, the subimage decoder 7, and the voice decoder 8.
[0111] The main image compressed data outputted to the 1st video decoder 22 and the 2nd video decoder 23 is the so-called coded-image data, and is data constituted by the so-called I picture, P picture, and B picture. And an output is performed to each above-mentioned video decoder 6 so that it may become for example, 1GOP unit. Moreover, the above-mentioned main image compressed data, subimage compressed data, and speech compression data are supplied to each decoder with which it was pack-ized and the latter part of a demultiplexer 5 was equipped.
[0112] In addition, it has the frame memory equipped with three storage regions for decode for decode of I picture, P picture, and B picture, respectively in the 1st video decoder 22 and the 2nd video decoder 23.
[0113] The 1st video decoder 22 and the 2nd video decoder 23 decode each inputted coded-image data. Inter-frame prediction performs decode processing performed here. The decode image data decoded by this 1st video decoder 22 and the 2nd video decoder 23 is inputted into a transfer switch 24.
[0114] A transfer switch 24 supplies either of the decode image data from the video decoder 22 of the above 1st, or the 2nd video decoder 23 to the latter subimage decoder 7. Switching of a transfer switch 24 is performed by the controller 11.
[0115] For example, the data to which a transfer switch 24 outputs an instruction of a switch during the output of the decode image data from the 1st video decoder 21 by switch actuation a carrier beam case are switched to decode image data from the 2nd video decoder 23. Therefore, the coded-image data decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 are switched by this transfer switch 24 in an instant so that either may be outputted. For example, such switching is performed in the case of a switch of the image of an angle type.
[0116] The decode image data outputted through the above-mentioned transfer switch 24 is displayed on a monitor 200 as an image through the subimage decoder 7 and the NTSC conversion circuit 9.
[0117] Therefore, since it can switch in an instant and can reproduce on the image of other angle types during playback of the image of the angle type of 1, the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation can display the image of other angle types of the switched flash concerned on a monitor 200.
[0118] with this DVD regenerative apparatus 1, a viewer wants to see, when it switches to the image of other angle types — being concerned — others — overlooking the image of an angle type is lost.
[0119] not only an image with the seamless image of an angle type here — non, you may be a seamless image, and regardless of the class of these images, the DVD regenerative apparatus 1 can be switched in an instant, and can be reproduced.
[0120] In addition, even if it switches to the image of an angle type besides the above, about subimage data and voice data, the

thing of the data of the image up Norikazu's angle type is used, for example. That is, the subimage data and voice data of an image of an angle type besides the above are not decoded, without being outputted from the above-mentioned demultiplexer 5.
[0121] Moreover, when a difference is in a bit rate by the coded-image data inputted into the coded-image data inputted into the 1st video decoder 22, and the 2nd video decoder 23, The capacity of the opening of the video buffer which is prepared between a demultiplexer 5, the free area of the video buffer which is prepared between the 1st video decoder 22, and which is not illustrated, a demultiplexer 5, and the 2nd video decoder 23 and which is not illustrated For example, what is necessary is to supervise by the controller 11 and just to send out data to a video buffer with an empty field from a demultiplexer 5. In addition, each video buffer is a buffer which absorbs the difference between the processing speed of distribution processing of a demultiplexer 5, and the processing speed of each video decoder decode. That is, if an opening is lost to the buffer of 1 using this buffer, data will be sent out to other buffers and the difference in a bit rate will be absorbed.
[0122] Moreover, it can also have the transfer switch 25 prepared between the video decoder 26 which has the processing speed twice the processing speed of usual in the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation as shown in drawing 9 , and a demultiplexer 5 and the video decoder 26.
[0123] The above-mentioned transfer switch 25 outputs the coded-image data from a demultiplexer 5 to the video decoder 26 for example, per 1GOP. Switching of this transfer switch 25 is performed by the controller 11.
[0124] For example, when an instruction of a switch is issued during the output of the coded-image data corresponding to the image of the angle type of 1, a transfer switch 25 outputs the coded-image data corresponding to the image of other angle types. Therefore, either the coded-image data corresponding to the image of the angle type of 1 or the coded-image data corresponding to the image of other angle types is outputted by switch actuation of this transfer switch 25.
[0125] The above-mentioned video decoder 26 can perform decode processing for the coded-image data from a transfer switch 25 with twice [usual] as many processing speed as this. And the decode compressed data decoded and obtained by the video decoder 26 is displayed on a monitor 200 as an image through the subimage decoder 7, the subimage decoder 7, and the NTSC conversion circuit 9.
[0126] Therefore, it is also an image with the seamless DVD regenerative apparatus 1 to have the video decoder 26 with the above-mentioned transfer switch 25 and decode processing of being twice many as this, and it can switch the angle type of an image in an instant.
[0127] Next, the gestalt of the 3rd operation is explained. The gestalt of this 3rd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.
[0128] The DVD regenerative apparatus used as the gestalt of this 3rd operation is constituted so that the image of two or more angle types may be reproduced simultaneously. Therefore, this DVD regenerative apparatus has the mixing circuit 27 which mixes the decode image data outputted, respectively from the 1st video decoder 23 and the 2nd video decoder 24 into which the main image compressed data from a demultiplexer 5 is inputted, respectively, this 1st video decoder 22, and the 2nd video decoder 23, as shown in drawing 10 .
[0129] That is, the DVD regenerative apparatus 1 used as the gestalt of the 3rd operation takes the configuration which replaces with the transfer switch 24 in the DVD regenerative apparatus 1 used as a gestalt of the 2nd operation, and is equipped with a mixing circuit 27.
[0130] Thus, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it now to a monitor 200.
[0131] For example, the decode image data which constitutes the image of the 1st angle type from the 1st video decoder 22 is outputted. When the decode image data which constitutes the image of the 1st angle type from the 2nd video decoder 23 is outputted, as it is shown in drawing 12 (a) thru/or drawing 12 (b), it is the image (it is shown in drawing 12 (a).) of the 1st angle type. The image of the 2nd angle type (it is shown in drawing 12 (b).) It displays simultaneously (it is shown in drawing 12 (c).). It can carry out.
[0132] In addition, if it is made for the image of the 1st angle type and the image of the 2nd angle type not to lap in the screen of a monitor 200 as shown in drawing 12 (c), the DVD regenerative apparatus 1 can share between the 1st video decoder 23 and the 2nd video decoder 24 the frame memory which consists of three storage regions for decode.
[0133] Moreover, when each of the 1st video decoder 22 and the 2nd video decoder 23 is equipped with a frame memory As shown in drawing 13 (a) thru/or drawing 13 (b), it is the image (it is shown in drawing 13 (a).) of the 1st angle type. The whole display screen of a monitor 200 is used, and it is the image (it is shown in drawing 13 (b).) of the 2nd angle type. It displays using some display screens of a monitor 200 (it is shown in drawing 13 (c).). It can also carry out.
[0134] Moreover, the DVD regenerative apparatus 1 can decode I picture, P picture, and B picture by using the frame memory which consists of three storage regions for decode, and the usual playback is attained.
[0135] Therefore, the DVD regenerative apparatus 1 can usually reproduce the image of an angle type which is simultaneously different two like the time of having two video decoders as mentioned above, and can display the image of an angle type which is different in the two ones concerned which were usually reproduced on a monitor 200.
[0136] Next, the gestalt of the 4th operation is explained. The gestalt of this 4th operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.
[0137] The DVD regenerative apparatus used as the gestalt of this 4th operation is constituted so that the image of two or more angle types can be reproduced simultaneously and the image of the angle type under playback can be switched seamlessly and momentarily. Therefore, the 1st video decoder 22 and the 2nd video decoder 23 into which the main image compressed data from a demultiplexer 5 is inputted, respectively as this DVD regenerative apparatus is shown in drawing 11 , The mixing circuit 27 which mixes the decode image data outputted, respectively from this 1st video decoder 22 and the 2nd video decoder 23,

The switch 28 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 1st video decoder 22, It has the switch 29 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 2nd video decoder 23.

[0138] Thus, where a switch 28 and a switch 29 are turned ON, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it to a monitor 200. For example, the mixed image can supply the DVD regenerative apparatus 1 to a monitor 200 so that it may be displayed on drawing 12 (c) and drawing 13 (c).

[0139] Furthermore, by actuation of ON/OFF of a switch 28 and a switch 29, the DVD regenerative apparatus 1 can switch the 1st video decoder 22 and the 2nd video decoder 23, and can also decode coded-image data. In this case, when a switch 28 is ON, a switch 29 is turned OFF, and a switch 29 is turned ON when a switch 28 is OFF.

[0140] For example, when an instruction of a switch is issued during the output of the decode image data which constitutes the image of the angle type of the 1st video decoder 22-1, the decode image data which constitutes the image of other angle types from the 2nd video decoder 23 can be outputted by turning OFF a switch 28 and turning ON a switch 29 by one side. That is, either of the image ********** decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 is switched in an instant, and is outputted.

[0141] Therefore, during playback of the image of the angle type of 1, it can switch in an instant, and can reproduce on the image of other angle types, and the DVD regenerative apparatus 1 can display the image of the angle type of the switched others concerned on a monitor 200.

[0142] Even if the DVD regenerative apparatus 1 which serve as a gestalt of the 4th operation from the above thing are reproducing two or more angle types simultaneously and a seamless image, they can also be switched to the image of other angle types in an instant.

[0143] With this DVD regenerative apparatus 1, the image of other angle types can be seen simultaneously and a viewer loses overlooking the image of an angle type to see when it switches to see other angle types by switch actuation further.

[0144] In addition, although playback of DVD with which the image of two angle types was recorded in the DVD regenerative apparatus 1 used as the gestalt of the 2nd thru/or the 4th operation was mentioned as the example and explained, three or more, for example, DVD with which the image of a two or more m angle type is recorded, are also reproducible. In this case, the DVD regenerative apparatus 1 constitutes each part so that it may become one m times the processing speed [m pieces and] of this about two pieces and twice as many processing speed as this, respectively.

[0145]

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the frame memory with which the DVD regenerative apparatus used as the gestalt of operation of the 1st of this invention is equipped.
[Drawing 2] It is the circuit diagram showing the above-mentioned DVD regenerative apparatus.
[Drawing 3] In the above-mentioned frame memory, when decoding coded-image data, it is the block diagram showing signs that especially I picture is decoded.
[Drawing 4] In the above-mentioned frame memory, when decoding coded-image data, it is the block diagram showing signs that I picture and P picture are decoded especially.
[Drawing 5] It is the top view showing the monitor used for explanation of the procedure which decodes coded-image data.
[Drawing 6] It is the block diagram showing the above-mentioned frame memory constituted in reverse playback.
[Drawing 7] In the frame memory constituted in the above-mentioned reverse playback, when decoding coded-image data, it is the block diagram showing signs that I picture and B picture are decoded especially.
[Drawing 8] It is the circuit diagram showing the DVD regenerative apparatus used as the gestalt of operation of the 2nd of this invention.
[Drawing 9] It is the circuit diagram showing the case where the important section of the DVD regenerative apparatus used as the gestalt of implementation of the above 2nd is changed.
[Drawing 10] It is the circuit diagram showing the important section configuration of the DVD regenerative apparatus used as the gestalt of operation of the 3rd of this invention.
[Drawing 11] It is the circuit diagram showing the important section configuration of the DVD regenerative apparatus used as the gestalt of operation of the 4th of this invention.
[Drawing 12] It is the top view showing the monitor with which the image of two or more angle types is displayed.
[Drawing 13] The image of two or more angle types is the top view showing the monitor currently displayed by the method of other displays.
[Drawing 14] It is the data format which shows DVD reproduced with the DVD regenerative apparatus used as the gestalt of the above 1st thru/or the 4th implementation.
[Drawing 15] It is the data format which shows GOP currently recorded on Above DVD.
[Description of Notations]
1 Signal Regeneration Equipment, 2 Pickup, 3 RF Circuit, 4 Data Decoder, 5 A demultiplexer, 14 A frame memory, 14a The storage region for a display, 14b The 1st storage region for decode, 14c The 2nd storage region for decode, 14d The 3rd storage region for decode, 21 A track buffer, 22 The 1st video decoder, 23 — the 2nd video decoder and 24 A transfer switch and 25 A transfer switch and 26 A video decoder and 27 A mixing circuit and 28 A switch and 29 Switch

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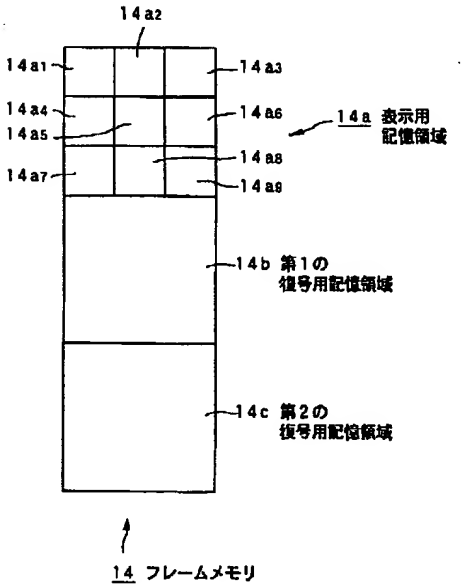
[Translation done.]

* NOTICES *

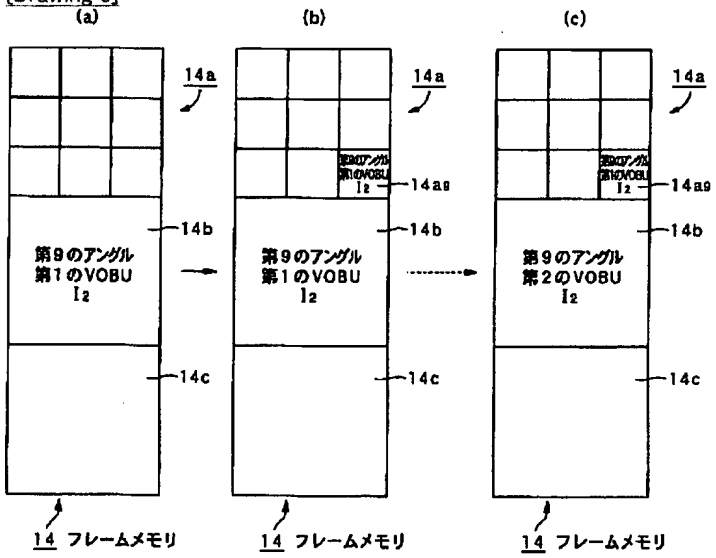
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

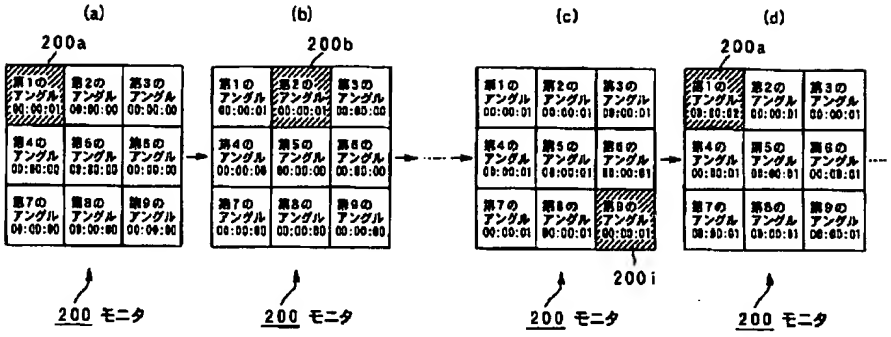
[Drawing 1]



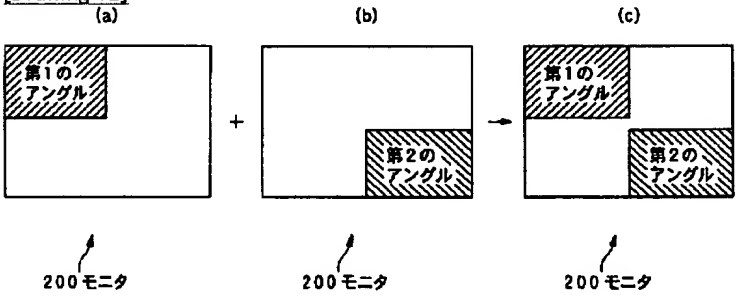
[Drawing 3]



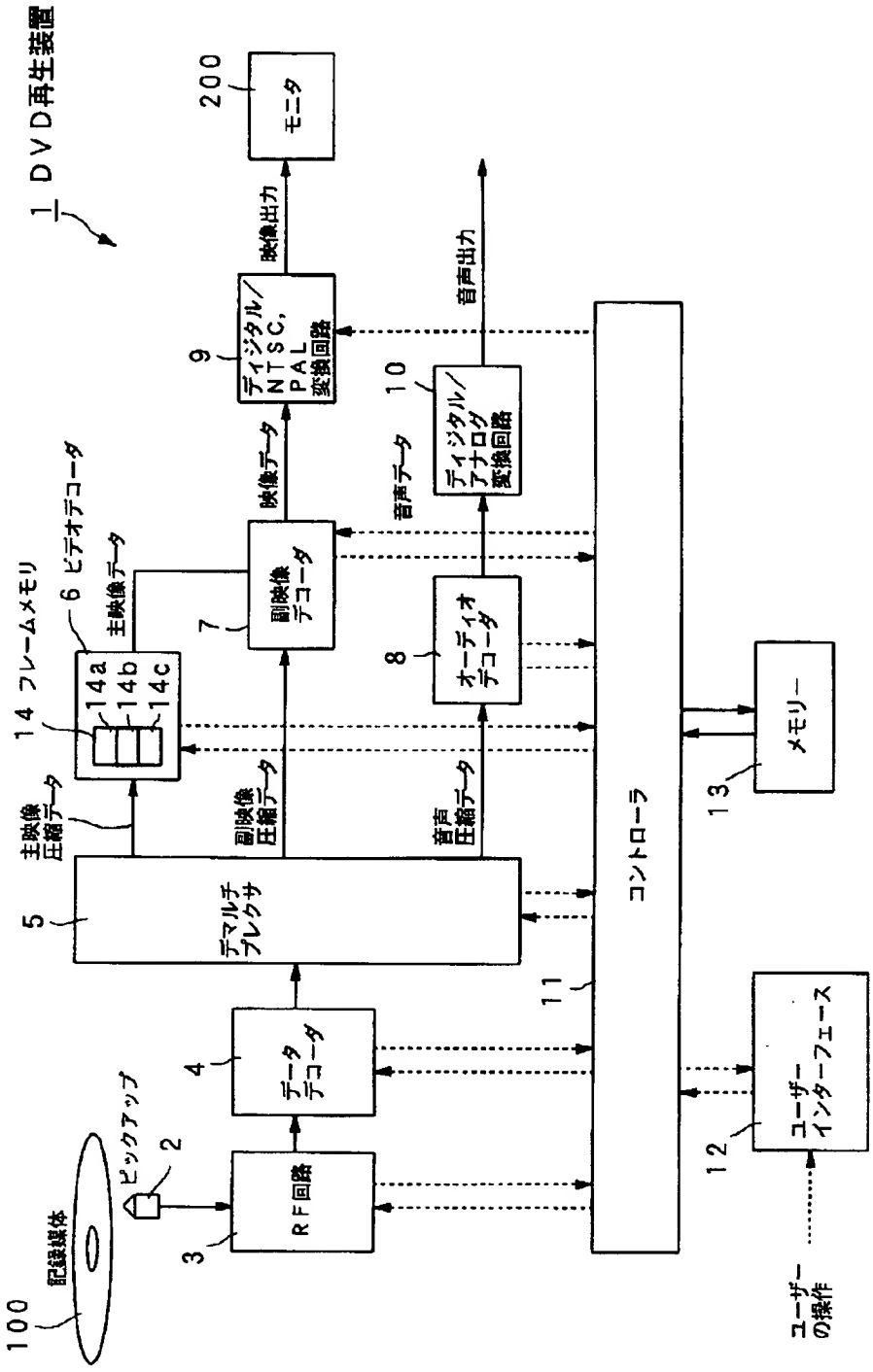
[Drawing 5]



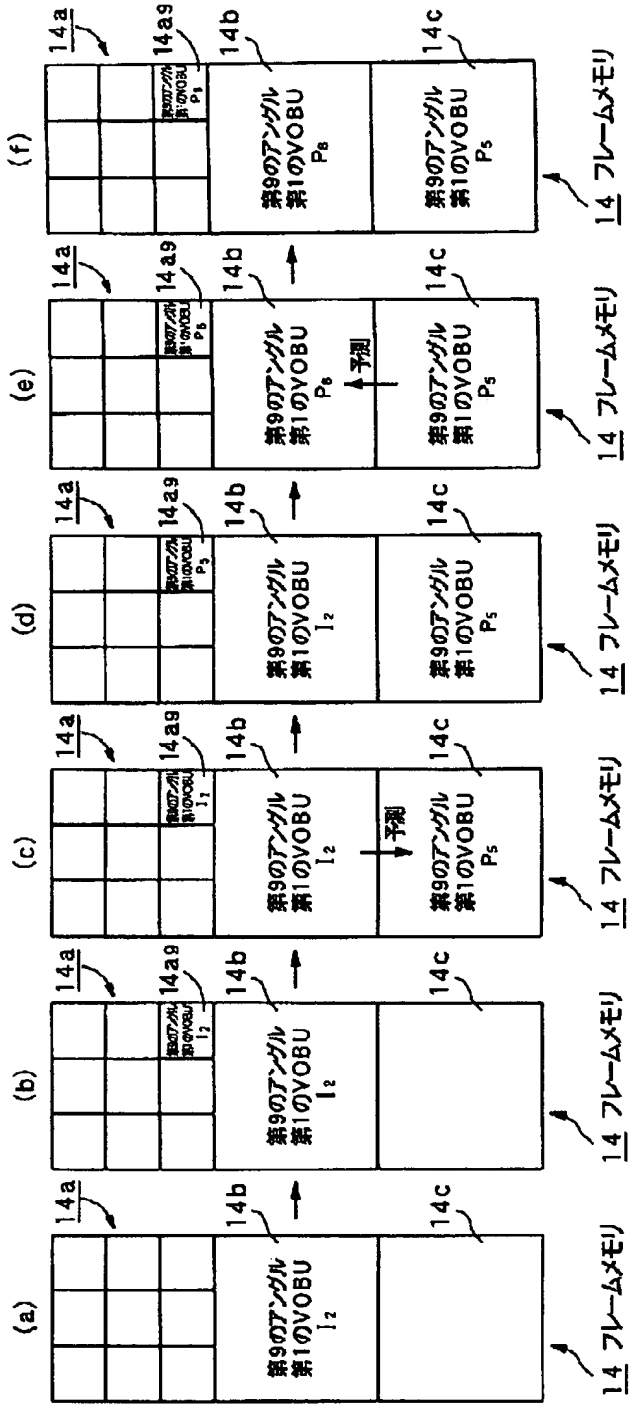
[Drawing 12]



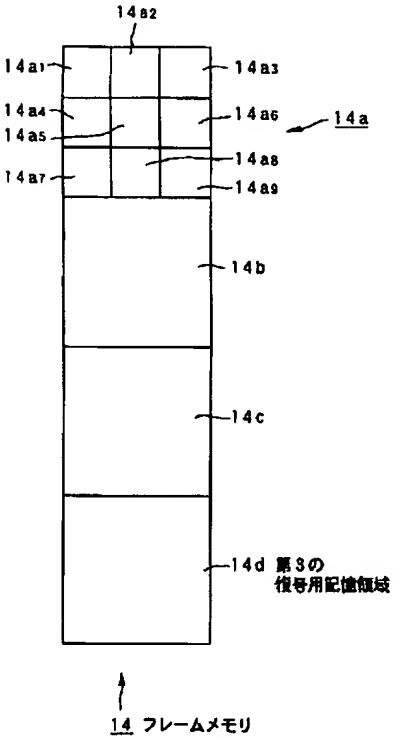
[Drawing 2]


1 DVD再生装置
100 記録媒体
2 ピックアップ
3 RF回路
4 データデコーダ
5 デマルチプレクサ
6 ビデオデコーダ
14 フレームメモリ
14a
14b
14c
主映像データ
副映像データ
7 副映像デコーダ
8 オーディオデコーダ
9 ディジタル/NTSC,PAL変換回路
10 ディジタル/アナログ変換回路
200 モニタ
主映像圧縮データ
副映像圧縮データ
音声圧縮データ
映像データ
音声データ
映像出力
音声出力
11 コントローラ
12 ユーザーインターフェース
13 メモリー
ユーザーの操作

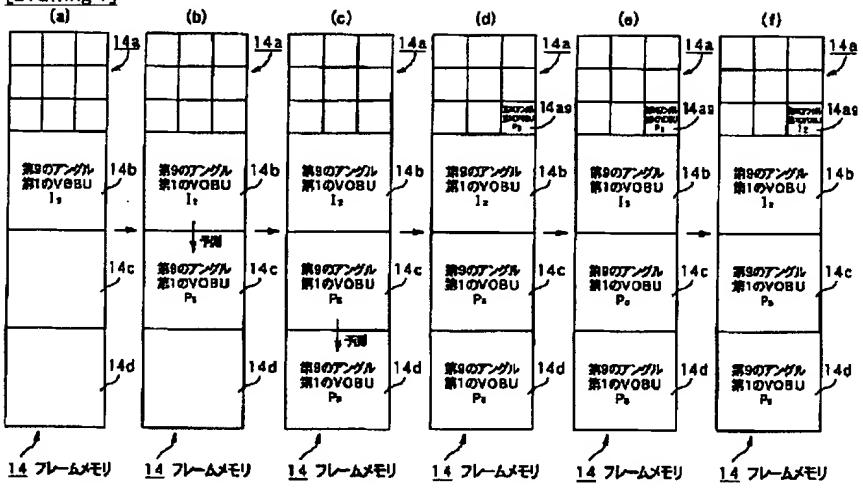
[Drawing 4]



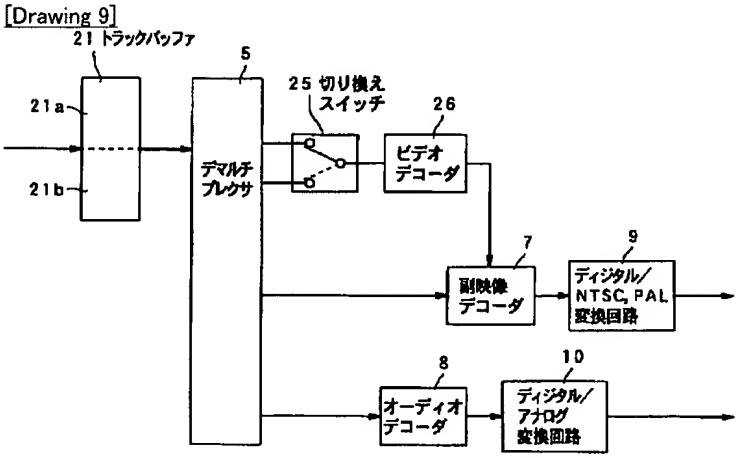
[Drawing 6]



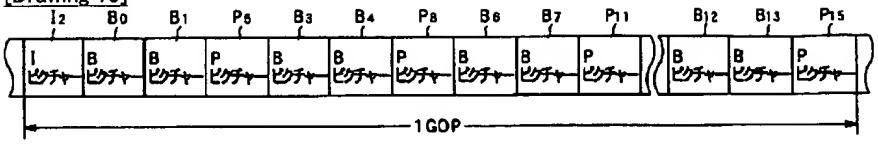
[Drawing 7]



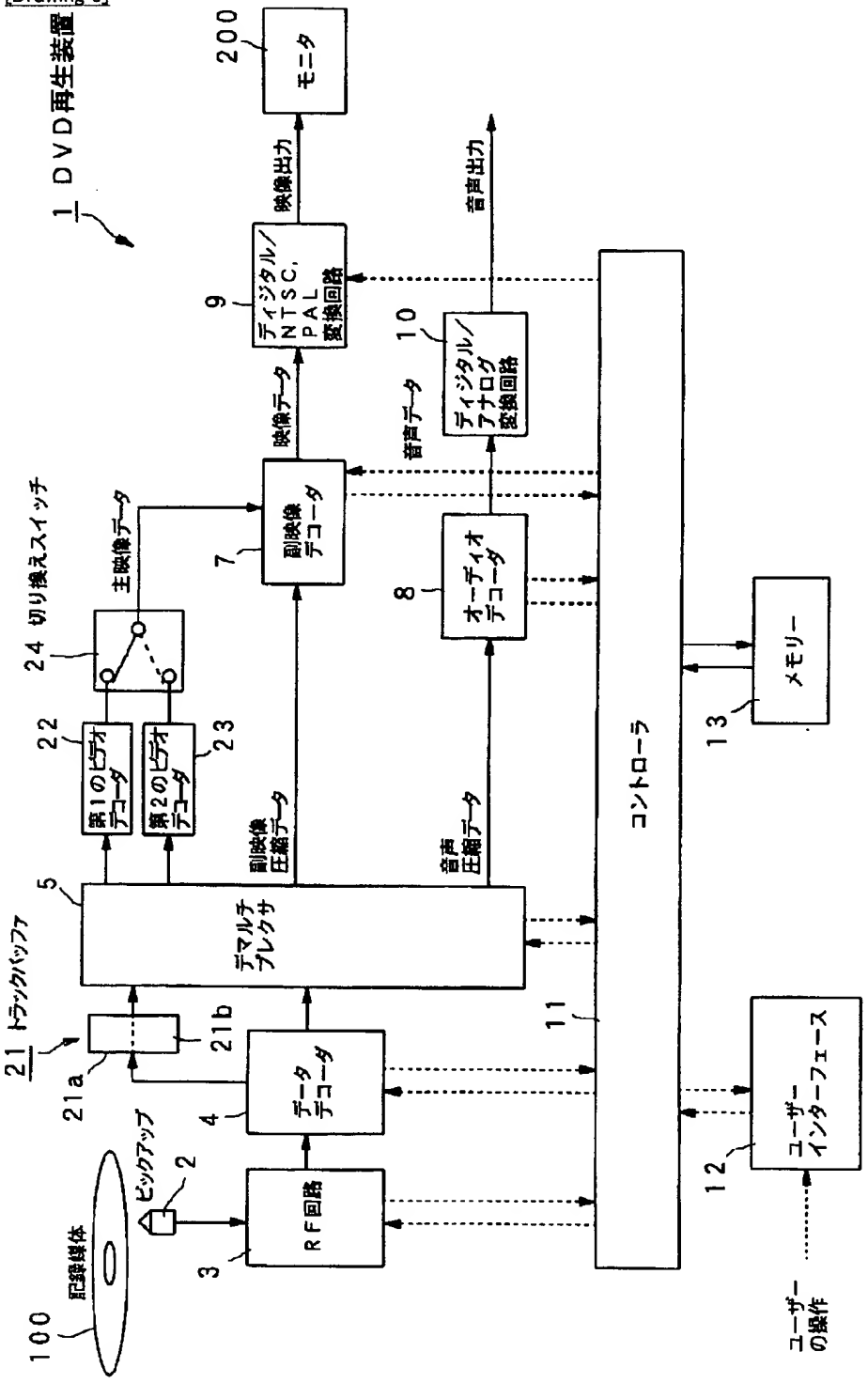
[Drawing 9]



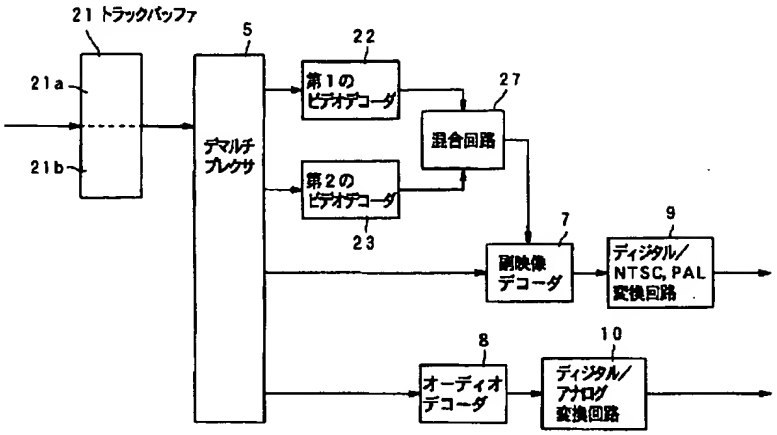
[Drawing 15]



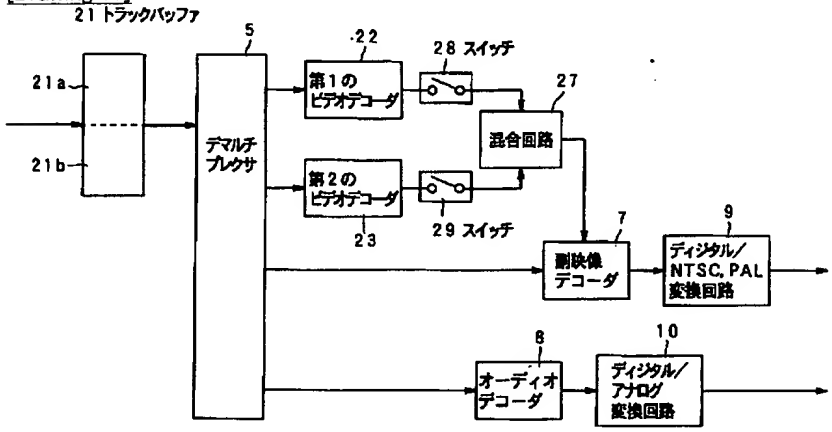
[Drawing 8]



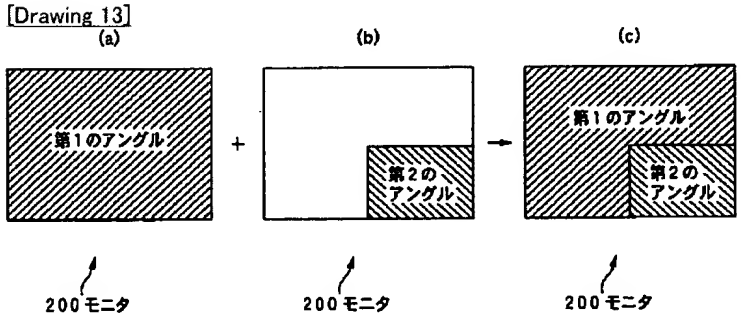
[Drawing 10]



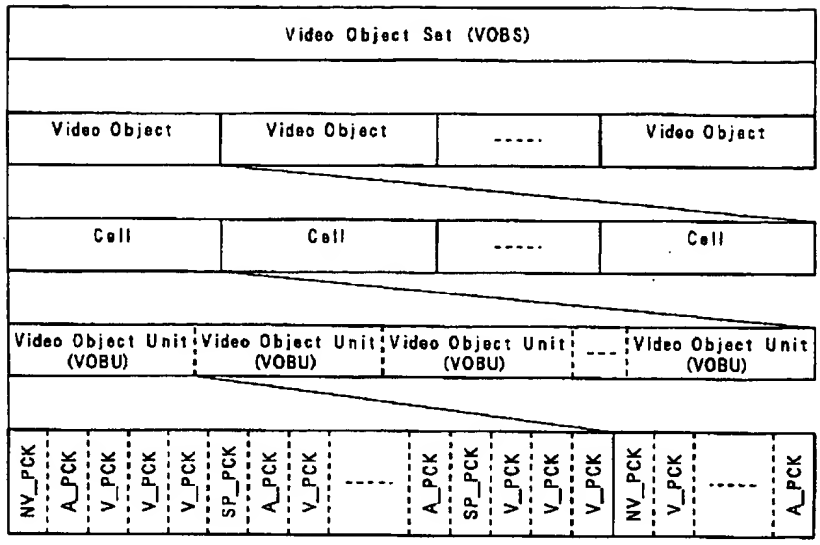
[Drawing 11]



[Drawing 13]



[Drawing 14]



[Translation done.]

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
[Category partition] The 3rd partition of the 7th category
[Publication date] December 2, Heisei 16 (2004. 12.2)

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[Date of Publication] November 13, Heisei 10 (1998. 11.13)
[Application number] Japanese Patent Application No. 9-113136
[The 7th edition of International Patent Classification]

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[Item(s) to be Amended] Claim 10
[Method of Amendment] Modification
[The content of amendment]
[Claim 10]
The read-out process which reads the coded-image data of the image of the above-mentioned two or more angle types from the record medium with which it is recorded, the image of two or more angle types being used as coded-image data,
the decode process which decodes the above-mentioned coded-image data of the angle type of one of the above-mentioned two or more angle types which carried out reading appearance, and which carried out [above-mentioned] reading appearance at the process, and generates the decode image data of the above-mentioned two or more angle types,
The decode image data storage process of memorizing the above-mentioned decode image data of the angle type of one of the above-mentioned two or more angle types generated according to the above-mentioned decode process,
The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data,
The control process read the display image data contain the above-mentioned decode image data which performed cutback processing to the above-mentioned decode image data memorized at the above-mentioned decode image data storage process, wrote in to the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region
It ****.
The signal regeneration approach by which it is characterized.

[Translation done.]

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審査請求　未請求　請求項の数11　ＯＬ　（全 19 頁）

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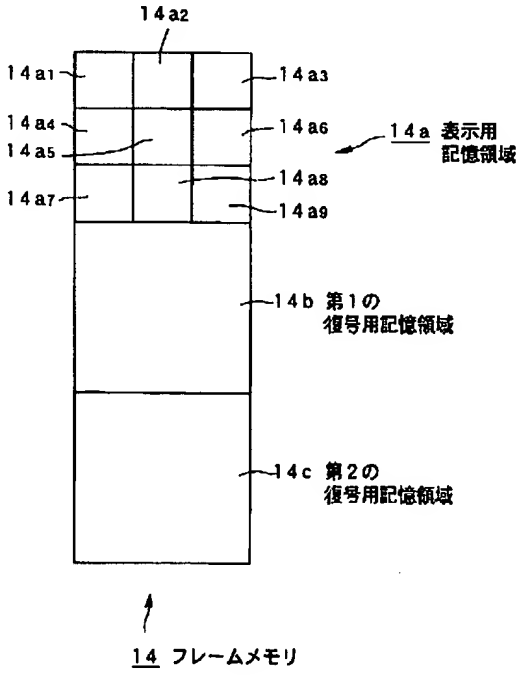
(54)【発明の名称】　信号再生装置及び方法

(57)【要約】

【課題】　ＤＶＤに記録されている複数のアングルの映像を、同時に又は切り換えられても瞬時に、スームレスな映像を見ることができるＤＶＤ再生装置を提供することを目的とする。

【解決手段】　ＤＶＤを再生するＤＶＤ再生装置の復号を行う際に用いるフレームメモリ１４を、９つの異なる映像、例えば９方向のアングルの映像、の表示用に対応して９つの記憶領域を形成する表示用記憶領域１４ａと、復号後のＩピクチャー及びＰピクチャー、すなわち復号画像データを記憶する第１の復号用記憶領域１４ｂ及び第２の復号用記憶領域１４ｃとを有して構成する。



【特許請求の範囲】
【請求項１】　複数アングルの映像が符号化画像データとされて記録されている記録媒体から、上記複数アングルの映像の符号化画像データを読み出す読み出し手段と、
上記読み出し手段で読み出した上記複数アングルの内の一のアングルの上記符号化画像データを復号して上記複数アングルの復号画像データを生成する復号手段と、
上記復号手段によって生成した上記複数アングルの内の一のアングルの上記復号画像データを記憶する復号用記憶手段と、
表示画像データを記憶し、分割表示するための記憶領域が形成される表示用記憶手段と、
上記復号用記憶手段に記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶手段の上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御手段とを備えることを特徴とする信号再生装置。
【請求項２】　上記復号用記憶手段を少なくとも１つ備え、
上記符号化画像データのフレーム内符号化画像データを、１つの上記復号用記憶手段を用いて復号して、上記記録媒体に記録されている上記複数アングルの映像を再生することを特徴とする請求項１記載の信号再生装置。
【請求項３】　上記復号用記憶手段を少なくとも２つ備え、
上記符号化画像データのフレーム間順方向符号化画像データを、２つの上記復号用記憶手段を用いて復号して、上記記録媒体に記録されている上記複数アングルの映像を再生することを特徴とする請求項１記載の信号再生装置。
【請求項４】　上記復号用記憶手段を少なくとも３つ備え、
上記符号化画像データのフレーム間順方向符号化画像データを、３つの上記復号用記憶手段を用いて復号して、上記記録媒体に記録されている上記複数アングルの映像を逆方向再生することを特徴とする請求項１記載の信号再生装置。
【請求項５】　複数アングルの映像が符号化画像データとして記録されている記録媒体から、上記複数アングルの上記符号化画像データを読み出す読み出し手段と、
上記読み出し手段で読み出した上記符号化画像データを記憶するm個の記憶手段と、
上記m個の記憶手段から出力された上記符号化画像データを復号して復号画像データを生成する復号手段とを備えることを特徴とする信号再生装置。
【請求項６】　上記復号手段をm個備え、このm個の各復号手段によって復号して得た各アングルの上記復号画像データを切り換えスイッチによって切り換て出力することを特徴とする請求項５記載の信号再生装置。
【請求項７】　上記復号手段は、m倍の復号の処理速度を有し、上記m個の記憶手段から出力された上記複数アングルの符号化画像データが切り換えられて入力されることを特徴とする請求項５記載の信号再生装置。
【請求項８】　上記復号手段をm個備え、このm個の各復号手段によって復号して得た各アングルの上記復号画像データを混合回路によって混合して出力することを特徴とする請求項５記載の信号再生装置。
【請求項９】　上記m個の各復号手段によって復号して得た各アングルの上記復号画像データを出力制御して上記混合回路に送るスイッチを有することを特徴とする請求項８記載の信号再生装置。
【請求項１０】　複数アングルの映像が符号化画像データとされて記録されている記録媒体から、上記複数アングルの映像の符号化画像データを読み出す読み出し工程と、
上記読み出し工程で読み出した上記複数アングルの内の一のアングルの上記符号化画像データを復号して上記複数アングルの復号画像データを生成する復号工程と、
上記復号工程によって生成した上記複数アングルの内の一のアングルの上記復号画像データを記憶する復号画像データ記憶工程と、
分割表示するための記憶領域が形成されて、表示画像データを記憶する表示用記憶工程と、
上記復号画像一タ記憶工程で記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶工程の有する上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御工程とを有することを特徴とする信号再生方法。
【請求項１１】　複数アングルの映像が符号化画像データとして記録されている記録媒体から、複数種類の上記符号化画像データを読み出す読み出し工程と、
上記読み出し工程で読み出した上記符号化画像データを記憶するm段の記憶工程と、
上記m段の記憶工程から出力された上記符号化画像データを復号して復号画像データを生成する復号工程とを有することを特徴とする信号再生方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、動画像を構成する符号化画像データを復号して動画像を再生する信号再生装置及び方法に関し、特に同一の属性を有する複数の動画像を再生する信号再生装置及び方法に関する。
【０００２】
【従来の技術】光ディスクに共通する特徴として、ランダムアクセスすることが挙げられる。光ディスクであるＤＶＤ（ディジタルビデオディスク：ＤＶＤ－ＶＩＤＥＯ）は、この特徴を生かし、マルチアングル機能やマル

チストーリー機能などが盛り込まれている。

【０００３】上記マルチアングル機能は、複数の異なるカメラアングルから同時に撮影した映像を再生する機能であって、例えば一の映像に対して複数のアングルの映像を再生可能にする機能である。

【０００４】ＤＶＤは、上記複数のアングルを選択再生可能にするデータをアングルブロックとして構成している。アングルブロックは、各アングルの映像データを細切れにして、形成されるもので、ＤＶＤでは、いわゆるインターリーブ構造を採用して、各アングルブロックを混ぜて信号記録面に記録している。ＤＶＤは、このようなデータの記録構造を採用することで、上記マルチアングル機能及びマルチストーリ機能を実現させている。

【０００５】ＤＶＤ再生装置は、例えば、上述のようなＤＶＤを再生して、再生中にみたいアングルの映像にリアルタイムで切り換えて再生することができる。

【０００６】なお、上記アングルブロックには、２種類あり、同時進行の映像が切り換えされた際に、切れ目なく、すなわちシームレス、に他のアングルにつなぎ合わせることが可能なアングルブロック（以下、ＳＭＬ＿ＡＧ＿ＢＬＫという。）と、それ以外のアングルブロック、つまりノンシームレスでしかアングルを切り換えできないアングルブロック（以下、ＮＳＭＬ＿ＡＧＬ＿ＢＬＫという。）とがある。

【０００７】

【発明が解決しようとする課題】ところで、上記ＳＭＬ＿ＡＧ＿ＢＬＫの再生を行った場合、上記ＤＶＤ再生装置は、シームレスにアングルを切り換えることはできるが、アングルを切り換えようとしてから切り替わるまで、約数秒の時間を要してしまう。つまり、上記ＤＶＤ再生装置は、アングルを切り換えようとした瞬間の別のアングルの再生ができないことになる。よって、視聴者は、他のアングルの映像を見たいときに切り換えても、その切り換えた瞬間の当該他のアングルの映像を見ることはできず、みたい映像を見逃してしまう。

【０００８】さらに、上記ＳＭＬ＿ＡＧ＿ＢＬＫの再生では、アングルを切り換えは、約数秒に１回に限られている。そして、全てのアングルにおいて、オーディオデータ及び字幕情報等からなる副映像データは、再生されるアングルの映像に係るものに限ってエンコードされている。

【０００９】また、上記ＮＳＭＬ＿ＡＧ＿ＢＬＫの再生を行った場合、上記ＤＶＤ再生装置は、アングルを切り換えようとしたときに一旦再生を中止してから、別のアングルに切り替えて再生を再開しなければならない。このように各アングルがスムーズにつながらない映像は視聴者にとって見ずらいものとなる。

【００１０】なお、上記ＮＳＭＬ＿ＡＧ＿ＢＬＫの再生では、アングルを切り換えようとした瞬間の別のアングルを再生することはできる。また、アングルを切り換えることが可能な場所も上記ＳＭＬ＿ＡＧ＿ＢＬＫより一般的に多い。さらに、他のアングルの映像に切り換えても、当該他のアングルの映像とは別のオーディオデータや副映像データをデコードすることができる。

【００１１】上記ＮＳＭＬ＿ＡＧ＿ＢＬＫ及びＮＳＭＬ＿ＡＧ＿ＢＬＫの再生を行った場合、ＤＶＤ再生装置は、アングルを切り換えることができたとしても、スームレス且つ瞬時にアングルを切り換えることはできない。

【００１２】また、例えば、同時に各アングルの映像表示を視聴者に提供できれば、各アングル映像を常に確認することができ、上述のように各アングルの切り換えによる映像の見逃し、見づらさを解消することができる。よって、複数のアングルの映像を同時に表示することを可能にする装置の提供も望まれる。

【００１３】そこで、本発明は、上述の実情を鑑みてなされたものであって、記録媒体に記録されている複数のアングルの映像を、同時に又は切り換えられても瞬時に、スームレスな映像を見ることができる信号再生装置及び方法を提供することを目的とする。

【００１４】

【課題を解決するための手段】本発明に係る信号再生装置は、上述の課題を解決するために、読み出し手段で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号手段と、復号手段によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号用記憶手段と、表示画像データを記憶し、分割表示するための記憶領域が形成される表示用記憶手段と、復号用記憶手段に記憶されている復号画像データに縮小処理を施して、この縮小処理した復号画像データを表示用記憶手段の記憶領域に書き込み、この記憶領域に書き込まれた復号画像データを含む表示画像データを読み出す制御手段とを備える。これらを備えることで、信号再生装置は、複数の復号画像データを表示用記憶手段の各記憶領域に記憶する。

【００１５】また、本発明に係る信号再生装置は、上述の課題を解決するために、読み出し手段で読み出した符号化画像データを記憶するｍ個の記憶手段と、ｍ個の記憶手段から出力された上記符号化画像データを復号して復号画像データを生成する復号手段とを備える。これらを備えることで、信号再生装置は、同時に又は切り換えて複数アングルの符号化画像データを復号する。

【００１６】さらに、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号工程と、復号工程によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号画像データ記憶工程と、分割表示するための記憶領域が形成され

て、表示画像データを記憶する表示用記憶工程と、復号画像データ記憶工程で記憶されている復号画像データに縮小処理を施して、この縮小処理した復号画像データを表示用記憶工程の有する記憶領域に書き込み、この記憶領域に書き込まれた復号画像データを含む表示画像データを読み出す制御工程とを有する。

【００１７】また、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した符号化画像データを記憶するm段の記憶工程と、m段の記憶工程から出力された符号化画像データを復号して復号画像データを生成する復号工程とを有する。

【００１８】

【発明の実施の形態】以下、本発明の実施の形態について、図面を参照しながら説明する。

【００１９】先ず第１の実施の形態は、本発明に係る信号再生装置及び方法を適用し、ＤＶＤ（ディジタルビデオディスク：ＤＶＤ－ＶＩＤＥＯ）を再生するように構成したＤＶＤ再生装置である。

【００２０】なお、ＤＶＤは、ＭＰＥＧ２（Moving Picture Coding Experts Group 2）によって圧縮符号化された画像が記録されている記録媒体であって、画像データを構成するデータとして、フレーム内符号化画像からなるＩピクチャー，フレーム間順方向予測符号化画像からなＰピクチャー，双方向予測符号化画像からなるＢピクチャーとが記録されている。

【００２１】上記Ｉピクチャーは、予測符号化を行わずに１つの画像を圧縮符号化して作れれる符号化画像データであって、自らデータのみの復号によって画像を生成する。上記Ｐピクチャーは、１つ前のフレーム内の画像から予測符号化して作られる符号化画像データである。上記Ｂピクチャーは、前後のフレーム内の画像から予測符号化して作られる符号化画像データである。

【００２２】すなわち、復号する際には、Ｉピクチャーは、他の符号化画像データを必要とせず、またＰピクチャー又はＢピクチャーは、他に１つ又は２つの符号化画像データを必要とする。これら符号化画像データの復号は、ＤＶＤ再生装置のフレームメモリ上でデータデコーダによって行われる。

【００２３】上記ＤＶＤを再生するＤＶＤ再生装置は、図１に示すように、復号を行う際に用いるフレームメモリ１４を、３つの領域に分割して構成している。フレームメモリ１４は、９つの異なる映像、例えば９方向のアングルの映像、の表示用に対応して９つの記憶領域を形成する表示用記憶領域１４ａと、復号後のＩピクチャー及びＰピクチャー、すなわち復号画像データを記憶する第１の復号用記憶領域１４ｂ及び第２の復号用記憶領域１４ｃとを有して構成される。

【００２４】上記第１の復号用記憶領域１４ａ及び第２の復号用記憶領域１４ｂには、上述のようにＩピクチャー又はＰピクチャーが記憶される。例えば、Ｐピクチャーの復号を行う場合、当該Ｐピクチャーを第１の復号用記憶領域１４ｂ又は第２の復号用記憶領域１４ｃの何れか一方に記憶して、他方の復号記憶領域に記憶されている復号後のＩピクチャー又はＰピクチャーの復号画像データを用いて復号を行う。

【００２５】そして、第１の復号用記憶領域１４ａ又は第２の復号用記憶領域で復号されたＩピクチャー又はＰピクチャーからなる復号画像データは、縮小処理が施されて上記表示用記憶領域１４ａ内の分割された領域に記憶される。

【００２６】上記表示用記憶領域１４ａは、表示画像データを記憶する領域であって、９つのアングの映像を表示するのに対応して９つの領域14_{a1}，14_{a2}，14_{a3}，14_{a4}，14_{a5}，14_{a6}，14_{a7}，14_{a8}，14_{a9}に分割して、この各領域に上記縮小処理が施された上記復号画像データを記憶するように構成されている。

【００２７】なお、表示画像データの再生によって、例えばモニタに表示用記憶領域１４ａ内の画像データが再生される。また、表示用記憶領域１４ａの記憶領域の態様は、任意に選択することができる。この場合、選択された態様に形成された記憶領域に記憶された上記復号画像データは、上記表示画面データによってモニタ等の表示画面の上記記憶領域に対応した部分に画像として再生される。

【００２８】例えばマルチアングル機能実行による再生では、上記各領域に同時刻のアングルの映像を構成する各復号画像データをそれぞれ記憶する。例えば、９つの領域に、第１のアングル乃至第９のアングルの映像に係る復号画像データを割り当てて記憶する。

【００２９】このように構成されたフレームメモリ１４を備えることで、例えばＤＶＤ再生装置は、ＤＶＤに記憶された複数のアングルの映像を構成する符号化画像データを復号して、一度にこれら復号して得た映像を例えばモニタの各表示部に表示することができる。

【００３０】以下、上記フレームメモリ１４について、図２に示すように構成されるＤＶＤ再生装置１を用いてさらに詳しく説明する。

【００３１】ＤＶＤ再生装置１は、図２に示すように、記録媒体（ＤＶＤ）１００からＲＦ信号を再生するピックアップ２と、このピックアップ２により再生されたＲＦ信号が供給されこのＲＦ信号の２値化処理等を行うＲＦ回路３と、ＲＦ回路３からの再生データが供給されエラー訂正等のデコード処理をするデータデコーダ４と、データデコーダ４によりデコード処理がされた再生データを主映像圧縮データ，副映像圧縮データ，音声圧縮データに振り分けるデマルチプレクサ５とを備える。

【００３２】なお、上記主映像圧縮データは、上記Ｉピクチャー，Ｐピクチャー及びＢピクチャー等の符号化画像データによって構成される。

【００３３】また、ＤＶＤ再生装置１は、上記フレーム

メモリ１４を備えてデマルチプレクサ５から出力された上記主映像圧縮データを復号するビデオデコーダ６と、上記副映像圧縮データを復号して上記主映像データと合成する副映像デコーダ７と、上記音声圧縮データを復号するオーディオデコーダ８と、副映像デコーダ７からの副映像データと主映像データが合成された映像データが供給されＮＴＳＣ信号又はＰＡＬ信号に変換するデジタル／ＮＴＳＣ，ＰＡＬ変換回路（以下、単にＮＴＳＣ変換回路という。）９と、オーディオデコーダ８からのオーディオデータが供給されアナログ信号に変換するデジタル／アナログ変換回路（以下、単にＡ／Ｄ変換回路という。）１０とを備える。

【００３４】さらに、ＤＶＤ再生装置１は、ピックアップ２，ＲＦ回路３，データデコーダ４，デマルチプレクサ５，ビデオデコーダ６，副映像デコーダ７，オーディオデコーダ８，ＮＴＳＣ変換回路９及びＡ／Ｄ変換回路１０を制御するコントローラ１１と、このコントローラ１１とユーザーの操作入力を媒介するユーザーインターフェース１２と、コントローラ１１のデータ記憶部となるメモリ１３とを備える。

【００３５】また、ＤＶＤ再生装置１から出力されたＮＴＳＣ変換回路９からのＮＴＳＣ信号又はＰＡＬ信号は、モニタ２００に入力されて映像化される。

【００３６】なお、このＤＶＤ再生装置１が再生する記録媒体１００は、図１４に示すように、映画の１作品等の単位とされて、Video Object Set（以下、ＶＯＢＳという。）で記録されている。

【００３７】上記ＶＯＢＳは、複数のVideo Object（以下、ＶＯＢという。）から構成されている。ＤＶＤは、例えば、１つの映画を複数のストーリー展開で見ることができるマルチストーリ機能に対応して上記ＶＯＢごとで異なるストーリ展開になるように構成されている。そして、ＶＯＢは、複数のＣｅｌｌにより構成される。

【００３８】上記Ｃｅｌｌは、例えば映画における１シーン等の単位となる。すなわち、この１シーン毎の組み合わせがＶＯＢとなり、この組み合わせの違いにより上記マルチストーリ機能等を構成する。そして、Ｃｅｌｌは、複数のVideo Object Unit（以下、ＶＯＢＵという。）により構成されている。

【００３９】上記ＶＯＢＵは、複数の主映像圧縮データ，副映像圧縮データ及び音声圧縮データのグループから構成される。主映像圧縮データ，副映像圧縮データ又は音声圧縮データは、後述するように、デマルチプレクサ５から主映像パック（Ｖ＿ＰＣＫ），副映像パック（ＳＰ＿ＰＣＫ）又は音声パック（Ａ＿ＰＣＫ）にパック化されて出力される。

【００４０】上記主映像圧縮データは、映画の主映像となるデータであって、ＤＶＤフォーマットにおけるビデオストリームを構成する。また、副映像圧縮データは、字幕等のデータであって、ＤＶＤフォーマットにおけるサブピクチャーストリームを構成する。そして、音声圧縮データは、音声に関するデータであって、ＤＶＤフォーマットにおけるオーディオストリームを構成する。

【００４１】ここで、ＭＰＥＧ２方式でいうＧＯＰ（Group of Picture）は、ＤＶＤにおいて各アングルの映像データが細切れにされてなるアングルブロックとされ、インターリーブ構造を採用して、アングルブロックを混ぜてＤＶＤに記録されている。ＧＯＰは、例えば１ＶＯＢＵ内にインターリーブ構造を採用して記録されている。そして、１ＧＯＰは、通常、図１５に示すように、Ｉピクチャー，Ｐピクチャー及びＢピクチャーによって構成され、これらＩピクチャー，Ｐピクチャー及びＢピクチャーが合計で１５枚になるように構成されている。

【００４２】上記フォーマットによってデータが記録された記録媒体（ＤＶＤ）１００は、ＤＶＤ再生装置１の備えるピックアップ２によってそのデータが読み出される。

【００４３】ピックアップ２は、当該ピックアップ２に組み込まれているレーザ光源からのレーザ光を記録媒体１００の信号記録面に照射して、信号記録面で反射された反射光を受光する。ピックアップ２は、受光した光に応じて再生したＲＦ信号をＲＦ回路３に供給する。

【００４４】ＲＦ回路３は、このＲＦ信号の波形等化及び２値化等をして再生データとその同期信号等を生成する。このＲＦ回路３により生成されたディジタルデータ等は、データデコーダ４に供給される。

【００４５】データデコーダ４は、ＲＦ回路３により生成された再生データに基づきデータの復調や誤り訂正等の処理を行う。データデコーダ４により復調等がされたディジタルデータは、デマルチプレクサ５に供給される。

【００４６】ここで、ディジタルデータには、主映像圧縮データが含まれている。よって、符号化画像データは、ピックアップ２，ＲＦ回路３，データデコーダ４によって記録媒体１００から読み出されたことになる。

【００４７】デマルチプレクサ５は、データデコーダ４によりエラー訂正のデコード処理等が施された記録媒体１００から再生したディジタルデータを、各種パック、すなわち、主映像パック、副映像パック又は音声パックに分割して、後段の各デコーダに当該各パックを出力する。

【００４８】なお、デマルチプレクサ５と上記データデコーダ４の処理速度を吸収するために、デマルチプレクサ５とデータデコーダ４の間にトラックバッファが設けられている。

【００４９】デマルチプレクサ５は、主映像圧縮データからなる主映像パックをビデオデコーダ６に供給し、副映像圧縮パックからなる副映像パックを副映像デコーダ７に供給し、音声圧縮パックからなる音声パックをオーディオデコーダ８に供給する。

【００５０】ビデオデコーダ６は、供給された主映像パック内の主映像圧縮データの復号処理を行い、この復号処理により伸長化された主映像データを生成する。ここで、主映像データは、復号されたＩピクチャー，Ｐピクチャー，Ｂピクチャーとされる復号画像データである。そして、ビデオデコーダ６は、復号処理を行うために上述のフレームメモリ１４を有している。

【００５１】ここで、上記ビデオデコーダ６が上記フレームメモリ１４を用いて行う復号処理について、例えばマルチアングル機能を実行可能に構成された例えばＶＯＢＵ内の第９のマルチアングルの映像のＩピクチャー又はＩピクチャー及びＰピクチャーを復号して、順方向再生を行う場合について説明する。なお、上記Ｉピクチャーの復号については、第１のＶＯＢＵ、そして第２のＶＯＢＵ内のＩピクチャーI_2を順次復号する場合について説明する。また、上記Ｉピクチャー及びＰピクチャーの復号処理については、第１のＶＯＢＵ内のＩピクチャーI_2，ＰピクチャーP5，ＰピクチャーP8を順次復号する場合について説明する。

【００５２】Ｉピクチャーのみの復号を行う場合、ビデオデコーダ６は、図３（ａ）に示すように、入力された主映像圧縮データを構成する内のＩピクチャーI_2を復号してフレームメモリ１４の第１の復号用記憶領域１４ｂに記憶する。ビデオデコーダ６は、ＩピクチャーI_2の復号を、例えば第１の復号用記憶領域１４ｂ上で書き換えながら行う。

【００５３】復号後、ビデオデコーダ６は、図３（ｂ）に示すように、復号したＩピクチャーI_2に縮小処理を施して、表示用記憶領域１４ａの第９のアングルの表示用の領域14_{a9}に当該縮小処理を施した復号後のＩピクチャーI_2をコピーする。

【００５４】上記表示用記憶領域１４ａに縮小処理された記憶されたＩピクチャーI_2は、上記副映像デコーダ７及びＮＴＳＣ変換回路９を介してモニタ２００の分割された表示部に画像として映し出される。

【００５５】ＤＶＤ再生装置１は、復号したＩピクチャーI_2による生成した画像を映す一方、図３（ｃ）に示すように、フレームメモリ１４の第１の復号用記憶領域１４ｂに、次のＩピクチャー、すなわ第２のＶＯＢＵ内に記録されていたＩピクチャーI_2を記憶する。ここで、ビデオデコーダ６は、第１のＶＯＢＵのＩピクチャーI_2で行ったと同様に、この第２のＶＯＢＵのＩピクチャーI_2を復号して、その後に縮小処理を施し、表示用記憶領域１４ａにコピーする。

【００５６】上記表示用記憶領域１４ａに縮小処理されてコピーされた第２のＶＯＢＵのＩピクチャーI_2は、モニタ２００において上記第１のＶＯＢＵのＩピクチャーI_2の次の画像とされて映し出される。詳しくは、上述のようにビデオデコーダ６において復号して得た復号画像データ（主映像データ）は、副映像デコーダ７に供給される。

【００５７】副映像デコーダ７は、供給された副映像パック内の副映像圧縮データの復号処理を行い、この復号処理をした副映像データをビデオデコーダ６から供給された上記主映像データに合成して、映像データを生成する。すなわち、副映像デコーダ７は、副映像データとして再生される字幕データ等を上記主映像データと合成する。なお、この副映像デコーダ７は、副映像データが無い場合には、主映像データをそのまま映像データとして出力する。副映像デコーダ７は、生成した映像データをＮＴＳＣ変換回路９に供給する。

【００５８】ＮＴＳＣ変換回路９は、映像データをディジタルデータからＮＴＳＣやＰＡＬ等のテレビジョン信号に変換する。ＮＴＳＣ変換回路９からのテレビジョン信号は、モニタ２００に映像として映し出される。

【００５９】モニタ２００に入力されたテレビジョン信号には、上記ビデオデコーダ６で復号されたＩピクチャーI_2が含まれている。また、モニタ２００は、上記フレームメモリ１４の表示用記憶領域１４ａの分割された複数の記憶領域に対応して表示画面が９つに分割表示される。ここで、分割表示は、例えば表示用記憶領域の分割態様に従う。したがって、モニタ２００の表示画面が分割されてなるーの表示部に、上記ＩピクチャーI_2に基づく映像が映し出される。

【００６０】なお、オーディオデコーダ８は、音声パック内の音声圧縮データの復号処理を行い、伸長した音声データを生成する。すなわち、オーディオデコーダ８は、音声データがＭＰＥＧ２方式によって圧縮されていれば、これに対応した伸長処理をして、音声圧縮データを生成する。また、オーディオデコーダ８は、ＭＰＥＧ２のフォーマットの他に、リニアＰＣＭ又はドルビーＡＣ３のフォーマットであれば、これに対応した処理を行う。オーディオデコーダ８は、生成した音声データをＡ／Ｄ変換回路１０に供給する。

【００６１】Ａ／Ｄ変換回路１０は、ディジタルデータである音声データをアナログの音声データに変換して出力する。この出力をスピーカ等に供給することにより、ユーザーが記録媒体１００から再生した映像を視聴することができる。

【００６２】コントローラ１１は、ピックアップ２，ＲＦ回路３，データデコーダ４，デマルチプレクサ５，ビデオデコーダ６，副映像デコーダ７，オーディオデコーダ８，ＮＴＳＣ変換回路９及びＡ／Ｄ変換回路１０の制御を行う。また、このコントローラ１１には、操作パネルやリモートコントローラであるユーザーインターフェース１２を介して操作入力がされ、この操作入力に基づき各回路の制御を行う。

【００６３】このコントローラ１１は、ビデオデコーダ６を介して、フレームメモリ１４での書き込み制御及び読み出し制御を行う。すなわち、コントローラ１１は、

フレームメモリ１４の復号用記憶領域に記憶されている復号画像データの縮小処理及び当該縮小処理した一の復号画像データを表示用記憶領域１４ａの分割表示のために形成される一の記憶領域に書き込み制御を行う。そして、コントローラ１１は、表示用記憶領域１４ａ内に記憶された復号画像データの読み出す読み出し制御を行う。

【００６４】なお、復号画像データの表示記憶領域１４ａからの読み出しは、表示記憶領域１４ａ単位の表示画像データの読み出しによって行われる。表示画像データによって、上記記憶領域に２００対応して上記一の記憶画像に記憶されている復号画像データによる画像がモニタの当該記憶領域に対応する表示位置に映し出される。

【００６５】よって、上述の第９のアングルのＩピクチャーに対して行った復号及び縮小処理を第１乃至第８のアングルのＩピクチャーに対しても同様に行うことで、ＤＶＤ再生装置１は、第９のアングルの映像と同時刻における第１乃至第８のアングルの映像を同時にモニタ２００に映し出すことができる。この場合、例えば、各アングルの画像を構成する符号化画像データの復号は、図５（ａ）乃至図５（ｄ）に示すように、第１のアングルの画像（２００ａ），第２のアングルの画像（２００ｂ），・・・・・，第９のアングルの画像（２００ｉ），そして第１のアングルの画像（２００ａ）を生成するような手順で行う。

【００６６】なお、Ｉピクチャーを復号するだけであれば、フレームメモリ１４は、上述のように少なくとも１つの復号用記憶領域を備えていればよい。

【００６７】また、Ｉピクチャー及びＰピクチャーの復号の場合については、ビデオデコーダ６は、図４（ａ）に示すように、入力されたＩピクチャーI_2が先ず復号してフレームメモリ１４の第１の復号用記憶領域１４ｂに記憶される。

【００６８】復号後、ビデオデコーダ６は、図４（ｂ）に示すように、復号したＩピクチャーI_2に縮小処理を施して、表示用記憶領域１４ａの第９のアングルの表示用の領域14_{a9}に当該縮小処理を施した復号後のＩピクチャーI_2をコピーする。

【００６９】上記表示用記憶領域１４ａに縮小処理されて記憶されたＩピクチャーI_2によって生成された画像は、フレームメモリ１４の表示用記憶領域１４ａに対応したモニタ２００の一の表示部に映し出される。

【００７０】一方、ビデオデコーダ６は、図４（ｃ）に示すように、次に入力されたＰピクチャーP_5を、第１の復号用記憶領域１４ｂに記憶されている復号後のＩピクチャーI_2によって予測して復号し、第２の復号用記憶領域１４ｃに記憶する。

【００７１】第２の復号用記憶領域１４ｃに復号後のＰピクチャーP_5を記憶した後、ビデオデコーダ６は、図４（ｄ）に示すように、復号したＰピクチャーP_5に縮小処理を施して、表示用記憶領域１４ａの領域14_{a9}に当該縮小処理を施した復号後のＰピクチャーP_5をコピーする。

【００７２】上記表示用記憶領域１４ａに縮小処理されて記憶されたＰピクチャーP_5によって生成された画像は、モニタ２００の上記一の表示部に映し出されていた上記ＩピクチャーI_2の次の画像として映し出される。

【００７３】ＰピクチャーP_8を復号する際には、ビデオデコーダ６は、図４（ｅ）に示すように、次に入力されたＰピクチャーP_8を、第２の復号用記憶領域１４ｃに記憶されている復号後のＰピクチャーP_5によって予測して復号し、第１の復号用記憶領域１４ｂに記憶する。

【００７４】第１の復号用記憶領域１４ｂに復号後のＰピクチャーP_8を記憶した後、ビデオデコーダ６は、図４（ｆ）に示すように、復号したＰピクチャーP_8に縮小処理を施して、表示用記憶領域１４ａの領域14_{a9}に当該縮小処理を施した復号後のＰピクチャーP_8をコピーする。

【００７５】上記表示用記憶領域１４ａに縮小処理されて記憶されたＰピクチャーP_8によって生成された画像は、モニタ２００の上記一の表示部に映し出されていた上記ＰピクチャーP_5の次の画像として映し出される。

【００７６】よって、モニタ２００の上記一の表示部には、復号されたＩピクチャー，Ｐピクチャーに基づく画像が次々に映し出されたことになる。

【００７７】ＤＶＤ再生装置１は、第９のアングルのＩピクチャー及びＰピクチャーに対して行った上述の復号及び縮小処理を第１乃至第８のアングルのＩピクチャー及びＰピクチャーに対しても同様に行うことで、第９のアングルの映像と同時刻における第１乃至第８のアングルの映像をモニタ２００の対応した各表示部に映し出すことができる。

【００７８】上述のＩピクチャー又はＩピクチャー及びＰピクチャーのみの復号によって行う順方向再生は、例えば高速再生を実行する場合に適用される。また、通常の再生を行うのであれば、フレームメモリ１４にさらに復号用記憶領域を設ければよい。

【００７９】また、ＤＶＤ再生装置１は、逆方向再生を行うこともでき、上述のように同時刻の第１乃至第９のアングルの映像をモニタ２００に映し出すこともできる。例えば、Ｉピクチャーを用いた逆方向再生は、第ｎのＶＯＢＵ内のＩピクチャーを復号した後、第ｎ－１のＶＯＢＵ内のＩピクチャーを復号するというように、ＧＯＰ内のＩピクチャーを復号して行う。

【００８０】そして、Ｉピクチャー及びＰピクチャーを用いた逆方向再生は、先ず第１の復号用記憶領域１４ｂでＩピクチャーを復号して、それをもとに第２の復号用記憶領域でＰピクチャーを復号を行う。例えば、第１の復号用記憶領域１４ｃでＩピクチャーI_2を復号し、そ

の復号したＩピクチャーＩ$_2$をもとに同一のＶＯＢＵ内のＰピクチャーＰ$_5$を第２の復号用記憶領域１４ｃで復号するというように復号処理を行い、モニタ２００への表示を復号順とは逆にする、すなわちＰピクチャーＰ$_5$，Ｉピクチャー Ｉ$_2$の順序で再生することで逆方向再生を行う。

【００８１】次にＤＶＤ再生装置１が逆方向再生可能に構成したフレームメモリ１４について、例えば、第９のアングルの映像を構成するＩピクチャー及びＰピクチャーを復号する場合について説明する。

【００８２】逆方向再生可能に構成したフレームメモリ１４は、図６に示すように、９つの記憶領域を形成する表示用記憶領域１４ａと、Ｉピクチャー又はＰピクチャーの復号後の復号画像データを記憶する第１の復号記憶領域１４ｂ，第２の復号記憶領域１４ｃ及び第３の復号用記憶領域１４ｄとを有して構成される。

【００８３】すなわち、逆方向再生に適用する場合は、フレームメモリ１４にさらに第３の復号用記憶領域１４ｄを設ける。

【００８４】逆方向再生する場合、図７（ａ）に示すように、入力されたＩピクチャーＩ$_2$を復号してフレームメモリ１４の第１の復号用記憶領域１４ｂに記憶する。

【００８５】その後、ビデオデコーダ６は、図７（ｂ）に示すように、次に入力したＰピクチャーＰ$_5$を、第１の復号用記憶領域１４ｂに記憶されている復号後のＩピクチャーＩ$_2$を用いた予測により復号して、第２の復号用記憶領域１４ｃに記憶する。

【００８６】さらにその後、ビデオデコーダ６は、図７（ｃ）に示すように、次に入力したＰピクチャーＰ$_8$を、第２の復号用記憶領域１４ｃに記憶されている復号後のＰピクチャーＰ$_5$を用いた予測により復号して、第３の復号用記憶領域１４ｄに記憶する。

【００８７】そして、表示用記憶領域１４ａへの各復号データのコピーは、上記復号の処理を行ったのと逆の順番で行う。すなわち、図７（ｄ）に示すように、先ず第３の復号用記憶領域１４ｄに記憶されている復号後のＰピクチャーＰ$_8$に縮小処理を施して、表示用記憶領域１４ａの第９のアングルの表示用の領域１４$_{a9}$に当該縮小処理を施した復号後のＰピクチャーＰ$_8$をコピーする。

【００８８】次に、図７（ｅ）に示すように、第２の復号用記憶領域１４ｃに記憶されている復号後のＰピクチャーＰ$_5$に縮小処理を施して、表示用記憶領域１４ａの領域１４$_{a9}$に当該縮小処理を施した復号後のＰピクチャーＰ$_5$をコピーする。

【００８９】そして、図７（ｆ）に示すように、第１の復号用記憶領域１４ｂに記憶されている復号後のＩピクチャーＩ$_2$に縮小処理を施して、表示用記憶領域１４ａの領域１４$_{a9}$に当該縮小処理を施した復号後のＩピクチャーＩ$_2$をコピーする。

【００９０】上述のように、ＰピクチャーＰ$_8$，ＰピクチャーＰ$_5$，ＩピクチャーＩ$_2$を表示用記憶領域１４ａの領域１４$_{a9}$に順次コピーすることによって、ＤＶＤ再生装置１は、上記領域１４$_{a9}$に対応するモニタ２００の一の表示部に、ＰピクチャーＰ$_8$，ＰピクチャーＰ$_5$，ＩピクチャーＩ$_2$の画像を順次表示することができる。

【００９１】なお、上述のＩピクチャー及びＰピクチャーのみの復号によって行う逆方向再生は、例えば高速逆再生を実行する場合に適用される。また、通常の逆方向再生を行うのであれば、フレームメモリ１４に復号用記憶領域を１つ設ければよい。

【００９２】以上、Ｉピクチャー又はＩピクチャー及びＰピクチャーのみの復号によって行うように構成されたフレームメモリ１４及びこのフレームメモリ１４を用いて逆方向再生を行う場合の説明である。

【００９３】ＤＶＤ再生装置１は、上述のように構成したフレームメモリ１４を備えることで、順方向再生及び逆方向再生において、同時刻における複数のアングルの映像を同時に表示することが可能になる。

【００９４】これにより、例えば、シームレスな映像切り換えにおいて問題とされた切り換えた瞬時の他のアングルの映像を見逃すという問題を解消することもできる。例えば、視聴者は、シームレスな映像を見ることができ、且つ見たい他のアングルの映像も同時に見ることができる。

【００９５】なお、再生するアングルの映像は、シームレスな映像ばかりでなく、ノンシームレスな映像であってよい。

【００９６】また、各アングルの映像は、例えば１ＶＯＢＵ単位として構成され、さらに、同時刻の映像の各アングルの映像は各ＶＯＢＵ間で属性をもっている。すなわち、ＤＶＤ再生装置１は、各アングルの映像の再生においては、上記対応づけされた各ＶＯＢＵ内のピクチャーを復号している。

【００９７】しかし、これに限定されず、ＤＶＤ再生装置１は、例えば、順方向再生時であって、他のアングルの映像のピクチャーを復号する場合、次の時刻に属するＶＯＢＵの上記他のアングルの映像を構成するピクチャーを復号していくこともできる。また、ＤＶＤ再生装置１は、逆方向再生時であって、他のアングルの映像のピクチャーを復号する場合、真の時刻に属するＶＯＢＵの上記他のアングルの画像を構成するピクチャーを復号していくこともできる。

【００９８】次に第２の実施の形態について説明する。第２の実施の形態は、本発明に係る信号再生装置及び方法を適用し、ＤＶＤを再生するように構成したＤＶＤ再生装置である。

【００９９】なお、ＤＶＤは、上述の第１の実施の形態と同様にマルチアングル機能を有するようなデータフォーマットで構成されている。すなわち、ＤＶＤは、ＭＰＥＧ２方式を採用しており、映像を、Ｉピクチャー，Ｐ

ピクチャー及びＢピクチャーとして圧縮符号化して記録している。以下、異なる２つのアングルの映像が記録されているＤＶＤを再生する場合について説明する。

【０１００】ＤＶＤ再生装置は、図８に示すように、２個のビデオデコーダを備えて、この２個のビデオデコーダによって復号して得た復号画像データの出力を切り換えて後段の回路に出力している。

【０１０１】詳しくは、ＤＶＤ再生装置１は、記録媒体１００からＲＦ信号を再生するピックアップ２と、このピックアップ２により再生されたＲＦ信号がされ、このＲＦ信号を２値化処理を行うＲＦ回路３と、ＲＦ回路３からの再生データ等が供給され、エラー訂正等のデコード処理をするデータデコーダ４と、第１の記憶領域２１ａ及び第２の記憶領域２１ｂを有し、データデコーダ４から出力されたディジタルデータを記憶するトラックバッファ２１と、データデコーダ４によりデコード処理がされたディジタルデータを主映像圧縮データ，副映像圧縮データ，音声圧縮データに振り分けるデマルチプレクサ５とを備える。

【０１０２】また、ＤＶＤ再生装置１は、デマルチプレクサ５から出力された上記主映像圧縮データを復号する第１のビデオデコーダ２２及び第２のビデオデコーダ２３と、上記副映像圧縮データを復号して主映像データと合成する副映像デコーダ７と、上記音声圧縮データを復号するオーディオデコーダ８と、副映像デコーダ７からの副映像データと主映像データが合成された映像データが供給されＮＴＳＣ信号又はＰＡＬ信号に変換するデジタル／ＮＴＳＣ，ＰＡＬ変換回路（以下、単にＮＴＳＣ変換回路という。）９と、オーディオデコーダ８からのオーディオデータが供給されアナログ信号に変換するデジタル／アナログ変換回路（以下、単にＡ／Ｄ変換回路という。）１０とを備える。

【０１０３】さらに、ＤＶＤ再生装置１は、ピックアップ２，ＲＦ回路３，データデコーダ４，デマルチプレクサ５，第１のビデオデコーダ２２，第２のビデオデコーダ２３，切り換えスイッチ２４，副映像デコーダ７，オーディオデコーダ８，ＮＴＳＣ変換回路９及びＡ／Ｄ変換回路１０を制御するコントローラ１１と、このコントローラ１１とユーザーの操作入力を媒介するユーザーインターフェース１２と、コントローラ１１のデータ記憶部となるメモリ１３とを備える。

【０１０４】上記記録媒体１００からＲＦ信号を再生するピックアップ２、このＲＦ信号を信号処理するＲＦ回路３及びＲＦ回路３で信号処理された再生データを復号するデータデコーダ４は、それぞれが処理速度を、通常処理の例えば２倍にすることができるように構成している。ここで、通常処理は、記録媒体１００から、例えば１つのアングルの映像分を読み込んで行った場合の処理をいう。

【０１０５】また、上記デマルチプレクサ５も、データの処理速度を、通常処理の２倍にすることができるように構成している。これにより、デマルチプレクサ５は、入力されてくる主映像圧縮データ，副映像圧縮データ及び音声圧縮データの振り分けを上記通常処理と異なることなく行うことができる。

【０１０６】以下、上記ＤＶＤ再生装置１の構成部分について説明する。なお、第１の実施の形態となるＤＶＤ再生装置１で説明した部分については、図２と同一の番号を付し、その説明を省略する。

【０１０７】ＤＶＤ再生装置１は、記録媒体１００に記録されている符号化画像データ等をピックアップ２、ＲＦ回路３及びデータデコーダ４を介してトラックバッファ２１に入力する。

【０１０８】上記トラックバッファ２１は、第１の記憶領域２１ａ及び第２の記憶領域２１ｂの２つの記憶領域を有している。トラックバッファ２１は、上記各記憶領域に入力されたディジタルデータを記憶する。ここで、ディジタルデータは、上述したように、デマルチプレクサ５によって分割される主映像圧縮データ，副映像圧縮データ，音声圧縮データを含んでいる。

【０１０９】このトラックバッファ２１は、上記データデコーダ４とデマルチプレクサ５との処理速度の違いを吸収している。そして、トラックバッファ４は、デマルチプレクサ５からの転送命令によってディジタルデータを当該デマルチプレクサ５に出力する。

【０１１０】デマルチプレクサ５は、上述したように通常処理速度の２倍の処理速度を有している。デマルチプレクサ５は、トラックバッファ２１の上記各記憶領域から出力されたディジタルデータを交互に取り込み、取り込んだディジタルデータを主映像圧縮データ，副映像圧縮データ及び音声圧縮データに分割して、第１のビデオデコーダ２２又は第２のビデオデコーダ２３、副映像デコーダ７及び音声デコーダ８に出力する。

【０１１１】第１のビデオデコーダ２２及び第２のビデオデコーダ２３に出力される主映像圧縮データは、いわゆる符号化画像データであって、いわゆるＩピクチャー，Ｐピクチャー，Ｂピクチャーによって構成されるデータである。そして、出力は、例えば１ＧＯＰ単位となるように上記各ビデオデコーダ６に対して行われる。また、上記主映像圧縮データ，副映像圧縮データ及び音声圧縮データは、パック化されてデマルチプレクサ５の後段に備えた各デコーダに供給される。

【０１１２】なお、第１のビデオデコーダ２２及び第２のビデオデコーダ２３とは、それぞれがＩピクチャー，Ｐピクチャー，Ｂピクチャーの復号のために３つの復号用記憶領域を備えたフレームメモリを有している。

【０１１３】第１のビデオデコーダ２２及び第２のビデオデコーダ２３は、入力された各符号化画像データを復号する。ここで行う復号処理は、フレーム間予測によって行う。この第１のビデオデコーダ２２及び第２のビデ

オデコーダ２３によって復号された復号画像データは、切り換えスイッチ２４に入力される。

【０１１４】切り換えスイッチ２４は、上記第１のビデオデコーダ２２又は第２のビデオデコーダ２３からの復号画像データの何れか一方を後段の副映像デコーダ７に供給する。切り換えスイッチ２４のスイッチングは、コントローラ１１によって行われる。

【０１１５】例えば、第１のビデオデコーダ２１からの復号画像データの出力中に切り換えの命令を受けた場合、切り換えスイッチ２４は、切り換え動作によって、出力するデータを第２のビデオデコーダ２３からの復号画像データに切り換える。よって、上記第１のビデオデコーダ２２及び第２のビデオデコーダ２３で復号された符号化画像データは、この切り換えスイッチ２４によって、何れか一方が出力されるように瞬時に切り換えられる。例えばこの様なスイッチングは、アングルの映像の切り換えの際に行われる。

【０１１６】上記切り換えスイッチ２４を介して出力された復号画像データは、副映像デコーダ７及びＮＴＳＣ変換回路９を介してモニタ２００に画像として表示される。

【０１１７】よって、第２の実施の形態となるＤＶＤ再生装置１は、一のアングルの映像の再生中に他のアングルの映像に瞬時に切り換えて再生することができるため、当該切り換えた瞬間の他のアングルの映像をモニタ２００に表示することができる。

【０１１８】このＤＶＤ再生装置１によって、例えば、視聴者は、他のアングルの映像に切り換えた時に見たい当該他のアングルの映像を見逃すことがなくなる。

【０１１９】ここでいうアングルの映像は、シームレスな映像ばかりでなく、ノンシームレスな映像であってもよく、ＤＶＤ再生装置１は、これらの映像の種類に関係なく瞬時に切り換えて再生することができる。

【０１２０】なお、上記他のアングルの映像に切り換えても副映像データ及び音声データについては、例えば、上記一のアングルの映像のデータのものを用いる。つまり、上記他のアングルの映像の副映像データ及び音声データは、上記デマルチプレクサ５から出力されることもなく、また、復号されることもない。

【０１２１】また、第１のビデオデコーダ２２に入力される符号化画像データと第２のビデオデコーダ２３に入力される符号化画像データとでビットレートに違いがある場合、デマルチプレクサ５と第１のビデオデコーダ２２の間に設けられている図示しないビデオバッファの空き領域とデマルチプレクサ５と第２のビデオデコーダ２３との間に設けられている図示しないビデオバッファの空きの容量とを、例えばコントローラ１１によって監視して、空きの領域のあるビデオバッファにデマルチプレクサ５からデータを送出すればよい。なお、各ビデオバッファは、デマルチプレクサ５の分配処理の処理速度と各ビデオデコーダ復号の処理速度の違いを吸収するバッファである。すなわち、このバッファを用い、一のバッファに空きがなくなったら、他のバッファにデータを送出して、ビットレートの違いを吸収する。

【０１２２】また、第２の実施の形態となるＤＶＤ再生装置１に、図９に示すように、通常の処理速度の２倍の処理速度をもつビデオデコーダ２６と、デマルチプレクサ５とビデオデコーダ２６との間に設けた切り換えスイッチ２５とを備えることもできる。

【０１２３】上記切り換えスイッチ２５は、デマルチプレクサ５からの符号化画像データを、例えば１ＧＯＰ単位でビデオデコーダ２６に出力する。この切り換えスイッチ２５のスイッチングは、コントローラ１１によって行われる。

【０１２４】例えば、一のアングルの映像に対応する符号化画像データの出力中に切り換えの命令が出された場合、切り換えスイッチ２５は、他のアングルの映像に対応する符号化画像データを出力する。よって、この切り換えスイッチ２５の切り換え動作によって、一のアングルの映像に対応する符号化画像データ又は他のアングルの映像に対応する符号化画像データの何れか一方が出力される。

【０１２５】上記ビデオデコーダ２６は、切り換えスイッチ２５からの符号化画像データを通常の２倍の処理速度で復号処理を行うことができる。そして、ビデオデコーダ２６で復号して得た復号圧縮データは、副映像デコーダ７及び副映像デコーダ７及びＮＴＳＣ変換回路９を介してモニタ２００に画像として表示される。

【０１２６】よって、上記切り換えスイッチ２５及び２倍の復号処理をもつビデオデコーダ２６を備えることでも、ＤＶＤ再生装置１は、シームレスな映像で且つ瞬時に映像のアングルを切り換えることができる。

【０１２７】次に第３の実施の形態について説明する。この第３の実施の形態は、本発明に係る信号再生装置及び方法を適用し、ＤＶＤを再生するように構成したＤＶＤ再生装置である。

【０１２８】この第３の実施の形態となるＤＶＤ再生装置は、複数のアングルの映像を同時に再生するように構成している。そのため、このＤＶＤ再生装置は、図１０に示すように、デマルチプレクサ５からの主映像圧縮データがそれぞれ入力される第１のビデオデコーダ２３及び第２のビデオデコーダ２４と、この第１のビデオデコーダ２２及び第２のビデオデコーダ２３からそれぞれ出力された復号画像データを混合する混合回路２７とを有している。

【０１２９】すなわち、第３の実施の形態となるＤＶＤ再生装置１は、第２の実施の形態として用いたＤＶＤ再生装置１における切り換えスイッチ２４に代えて混合回路２７を備える構成を採る。

【０１３０】このように構成されたＤＶＤ再生装置１

は、混合回路２７によって、第１のビデオデコーダ２２から出力された復号画像データと第２のビデオデコーダ２３から出力された復号画像データとを混合してモニタ２００に供給することができるようになる。

【０１３１】例えば、第１のビデオデコーダ２２から第１のアングルの映像を構成する復号画像データが出力され、第２のビデオデコーダ２３から第１のアングルの映像を構成する復号画像データが出力された場合、図１２（ａ）乃至図１２（ｂ）に示すように、第１のアングルの画像（図１２（ａ）に示す。）と第２のアングルの画像（図１２（ｂ）に示す。）とを同時に表示（図１２（ｃ）に示す。）することができる。

【０１３２】なお、図１２（ｃ）に示すように、モニタ２００の画面内において第１のアングルの画像と第２のアングルの画像とが重ならないようにするのであれば、ＤＶＤ再生装置１は、第１のビデオデコーダ２３と第２のビデオデコーダ２４とで３つの復号用記憶領域からなるフレームメモリを共有することができる。

【０１３３】また、フレームメモリを第１のビデオデコーダ２２及び第２のビデオデコーダ２３の各々が備えることによって、図１３（ａ）乃至図１３（ｂ）に示すように、第１のアングルの画像（図１３（ａ）に示す。）をモニタ２００の表示画面全体を使い、また第２のアングルの画像（図１３（ｂ）に示す。）をモニタ２００の表示画面の一部を使い表示（図１３（ｃ）に示す。）することもできる。

【０１３４】また、ＤＶＤ再生装置１は、３つの復号用記憶領域からなるフレームメモリを用いることで、Ｉピクチャー，Ｐピクチャー及びＢピクチャーを復号することができ、通常の再生が可能になる。

【０１３５】よって、ＤＶＤ再生装置１は、上述のように２つのビデオデコーダを備えたときと同様に、同時に２つ異なるアングルの映像を通常再生することができ、当該通常再生した２つのを異なるアングルの映像をモニタ２００に表示することができる。

【０１３６】次に第４の実施の形態について説明する。この第４の実施の形態は、本発明に係る信号再生装置及び方法を適用し、ＤＶＤを再生するように構成したＤＶＤ再生装置である。

【０１３７】この第４の実施の形態となるＤＶＤ再生装置は、複数のアングルの映像を同時に再生することができ、またシームレス且つ瞬間的に再生中のアングルの映像を切り換えることができるように構成している。そのため、このＤＶＤ再生装置は、図１１に示すように、デマルチプレクサ５からの主映像圧縮データがそれぞれ入力される第１のビデオデコーダ２２及び第２のビデオデコーダ２３と、この第１のビデオデコーダ２２及び第２のビデオデコーダ２３からそれぞれ出力された復号画像データを混合する混合回路２７と、第１のビデオデコーダ２２から出力される復号画像データについて混合回路２７に対して送出をオン及びオフするスイッチ２８と、第２のビデオデコーダ２３から出力される復号画像データについて混合回路２７に対しての送出をオン及びオフするスイッチ２９とを有している。

【０１３８】このように構成したＤＶＤ再生装置１は、スイッチ２８及びスイッチ２９をオンにした状態では、混合回路２７によって、第１のビデオデコーダ２２から出力された復号画像データと第２のビデオデコーダ２３から出力された復号画像データとを混合してモニタ２００に供給することができる。例えば、混合された映像が、図１２（ｃ）及び図１３（ｃ）に表示されるように、ＤＶＤ再生装置１は、モニタ２００に供給することができる。

【０１３９】さらに、ＤＶＤ再生装置１は、スイッチ２８及びスイッチ２９のオン／オフの操作によって、第１のビデオデコーダ２２及び第２のビデオデコーダ２３を切り換えて符号化画像データの復号を行うこともできる。この場合、スイッチ２８がオンのときスイッチ２９をオフにして、またスイッチ２８がオフのときスイッチ２９をオンにする。

【０１４０】例えば、第１のビデオデコーダ２２からの一のアングルの映像を構成する復号画像データの出力中に切り換えの命令が出された場合、スイッチ２８をオフにして、一方でスイッチ２９をオンにすることで、第２のビデオデコーダ２３から他のアングルの映像を構成する復号画像データを出力することができるようになる。すなわち、上記第１のビデオデコーダ２２及び第２のビデオデコーダ２３で復号された画像圧符号化データの何れか一方が瞬時に切り換えられて出力される。

【０１４１】よって、ＤＶＤ再生装置１は、一のアングルの映像の再生中に他のアングルの映像に瞬時に切り換えて再生することができ、当該切り換えた他のアングルの映像をモニタ２００に表示することができる。

【０１４２】以上のことから第４の実施の形態となるＤＶＤ再生装置１は、複数のアングルを同時に再生すること、またシームレスな映像であっても瞬時に他のアングルの映像に切り換えることもできる。

【０１４３】このＤＶＤ再生装置１によって、例えば、視聴者は、他のアングルの映像を同時に見ることができ、さらに切り換え操作によって他のアングルの見たいときでも、切り換えたときに見たいアングルの映像を見逃すことがなくなる。

【０１４４】なお第２乃至第４の実施の形態となるＤＶＤ再生装置１を、２つのアングルの映像が記録されたＤＶＤの再生を例に挙げて説明したが、３つ以上、例えば複数ｍのアングルの映像が記録されているＤＶＤを再生することもできる。この場合、ＤＶＤ再生装置１は、２個及び２倍の処理速度をそれぞれｍ個及びｍ倍の処理速度になるように各部を構成する。

【０１４５】

【発明の効果】本発明に係る信号再生装置は、読み出し手段で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号手段と、復号手段によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号用記憶手段と、表示画像データを記憶し、分割表示するための記憶領域が形成される表示用記憶手段と、復号用記憶手段に記憶されている復号画像データに縮小処理を施して、この縮小処理した復号画像データを表示用記憶手段の記憶領域に書き込み、この記憶領域に書き込まれた復号画像データを含む表示画像データを読み出す制御手段とを備えることで、符号化画像データによって構成される複数のアングルの映像を同時に再生することができる。

【０１４６】よって、上記信号再生装置は、例えば、ノンシームレスであるか否かに関わらず映像を同時に提供することができ、視聴者は、見たい映像を見逃すこともなくなる。

【０１４７】また、本発明に係る信号再生装置は、読み出し手段で読み出した符号化画像データを記憶するm個の記憶手段と、m個の記憶手段から出力された上記符号化画像データを復号して復号画像データを生成する復号手段とを備えることで、複数の符号化画像データを復号して、瞬時に切り換えて又は同時に、複数のアングルの映像を再生することができる。

【０１４８】そして、上記信号再生装置は、例えば、シームレスな映像の再生においても、瞬時に他のアングルの映像に切り換えることができる。

【０１４９】さらに、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号工程と、復号工程によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号画像データ記憶工程と、分割表示するための記憶領域が形成されて、表示画像データを記憶する表示用記憶工程と、復号画像データ記憶工程で記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶工程の有する上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御工程とを有することで、符号化画像データによって構成される複数のアングルの映像を同時に再生することができる。

【０１５０】よって、上記信号再生方法によれば、例えば、ノンシームレスであるか否かに関わらず映像を同時に提供することができ、視聴者は、見たい映像を見逃すこともなくなる。

【０１５１】また、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した符号化画像データを記憶するm段の記憶工程と、m段の記憶工程から出力された符号化画像データを復号して復号画像データを生成する復号工程とを有することで、複数の符号化画像データを復号して、瞬時に切り換えて又は同時に、複数のアングルの映像を再生することができる。

【０１５２】そして、上記信号再生方法によれば、例えば、シームレスな映像の再生においても、瞬時に他のアングルの映像に切り換えることができる。

【図面の簡単な説明】

【図１】本発明の第１の実施の形態となるＤＶＤ再生装置の備えるフレームメモリを示す構成図である。

【図２】上記ＤＶＤ再生装置を示す回路図である。

【図３】上記フレームメモリにおいて、符号化画像データを復号するとき、特にＩピクチャーを復号する様子を示す構成図である。

【図４】上記フレームメモリにおいて、符号化画像データを復号するとき、特にＩピクチャー及びＰピクチャーを復号する様子を示す構成図である。

【図５】符号化画像データを復号する手順の説明に用いたモニタを示す平面図である。

【図６】逆再生用に構成した上記フレームメモリを示す構成図である。

【図７】上記逆再生用に構成したフレームメモリにおいて、符号化画像データを復号するとき、特にＩピクチャー及びＢピクチャーを復号する様子を示す構成図である。

【図８】本発明の第２の実施の形態となるＤＶＤ再生装置を示す回路図である。

【図９】上記第２の実施の形態となるＤＶＤ再生装置の要部を変更した場合を示す回路図である。

【図１０】本発明の第３の実施の形態となるＤＶＤ再生装置の要部構成を示す回路図である。

【図１１】本発明の第４の実施の形態となるＤＶＤ再生装置の要部構成を示す回路図である。

【図１２】複数のアングルの画像が表示されているモニタを示す平面図である。

【図１３】複数のアングルの画像が他の表示の仕方で表示されているモニタを示す平面図である。

【図１４】上記第１乃至第４の実施の形態となるＤＶＤ再生装置によって再生されるＤＶＤを示すデータフォーマットである。

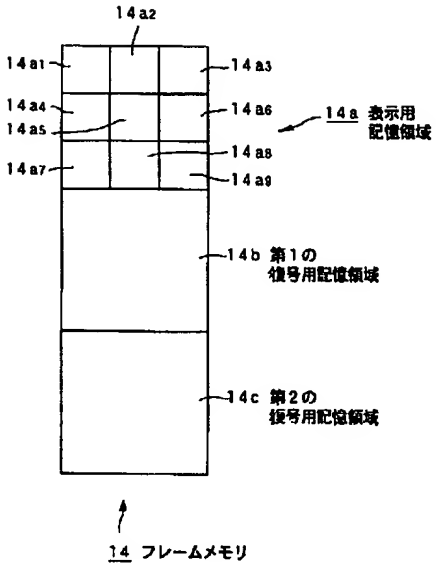
【図１５】上記ＤＶＤに記録されているＧＯＰを示すデータフォーマットである。

【符号の説明】

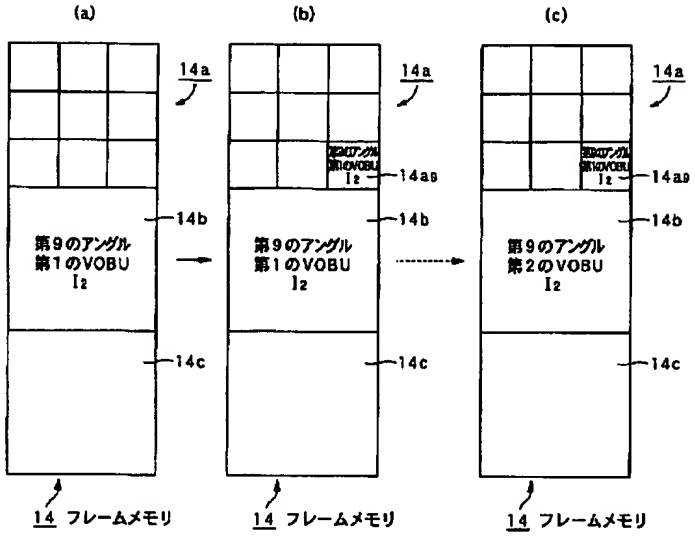
１　信号再生装置、２　ピックアップ、３　ＲＦ回路、４　データデコーダ、５　デマルチプレクサ、１４　フレームメモリ、１４ａ　表示用記憶領域、１４ｂ　第１の復号用記憶領域、１４ｃ　第２の復号用記憶領域、１４ｄ　第３の復号用記憶領域、２１　トラックバッファ、２２　第１のビデオデコーダ、２３第２のビデオデ

コーダ、２４　切り換えスイッチ、２５　切り換えスイ　　スイッチ、２９　スイッチ
ッチ、２６　ビデオデコーダ、２７　混合回路、２８

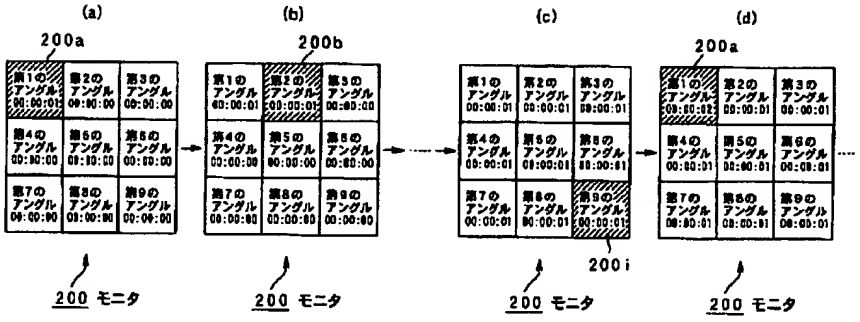
【図１】



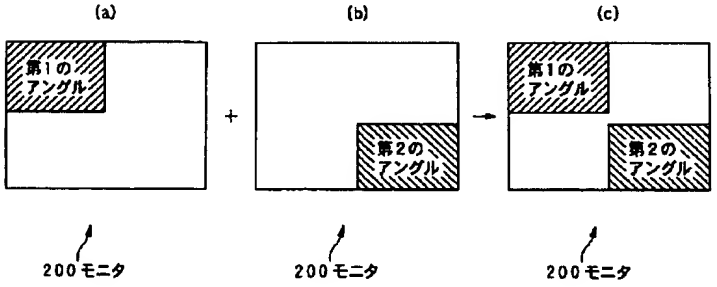
【図３】



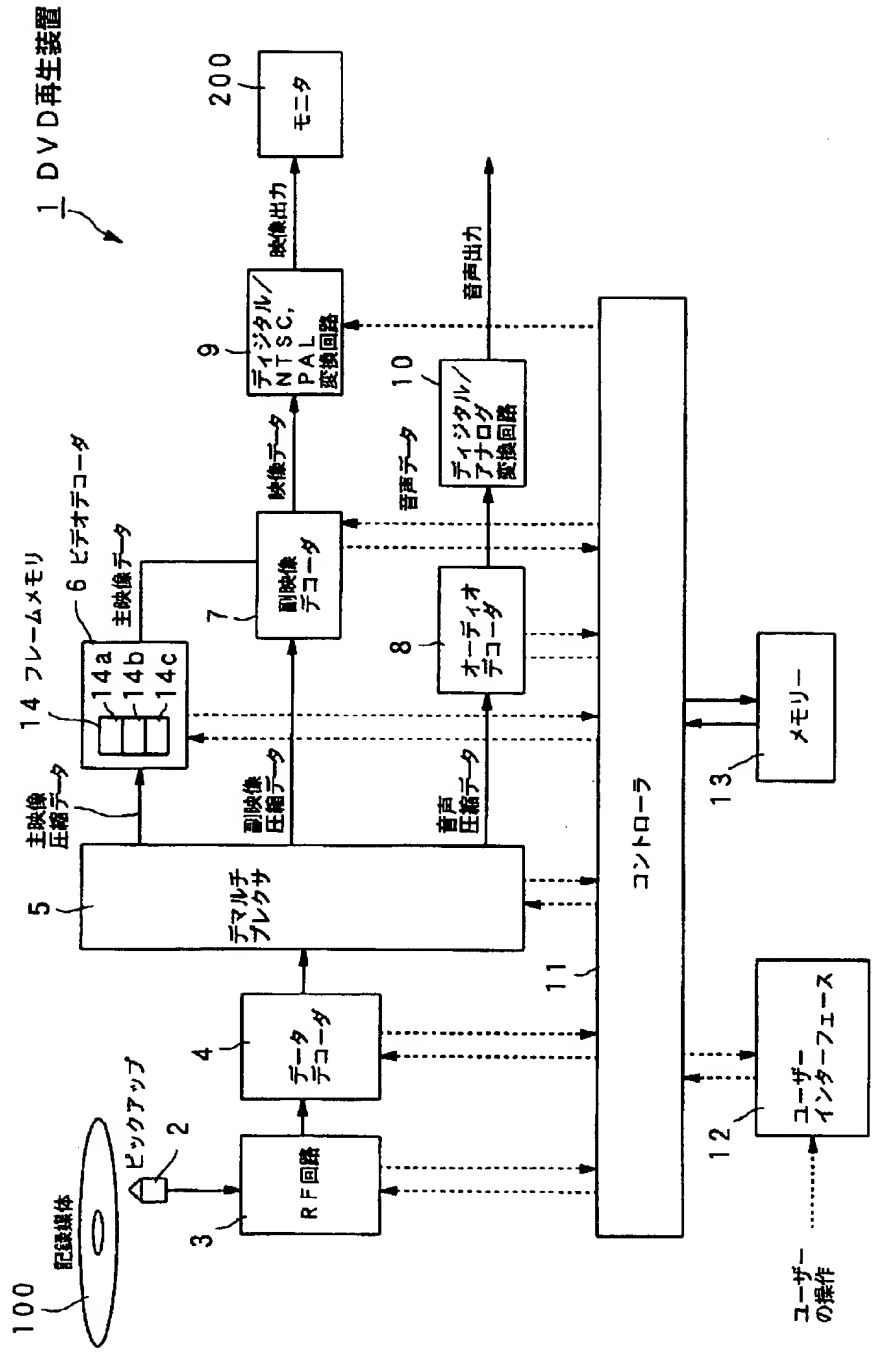
【図５】



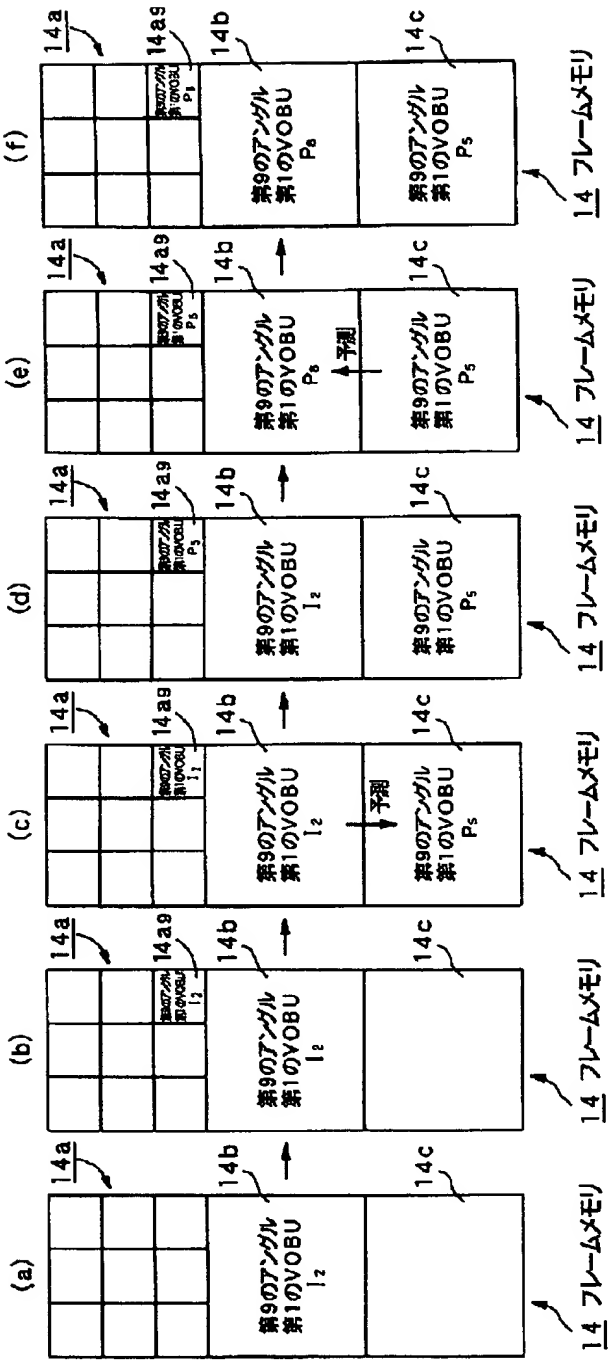
【図１２】



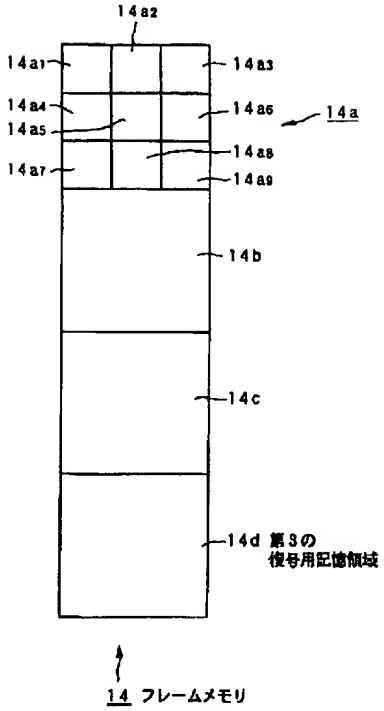
【図２】


1 DVD再生装置
100 記録媒体
2 ピックアップ
3 RF回路
4 データデコーダ
5 デマルチプレクサ
6 ビデオデコーダ
14 フレームメモリ
14a
14b
14c
主映像データ
主映像圧縮データ
副映像圧縮データ
音声圧縮データ
7 副映像デコーダ
8 オーディオデコーダ
9 ディジタル/NTSC,PAL変換回路
10 ディジタル/アナログ変換回路
映像データ
音声データ
映像出力
音声出力
200 モニタ
11 コントローラ
12 ユーザーインターフェース
13 メモリー
ユーザーの操作

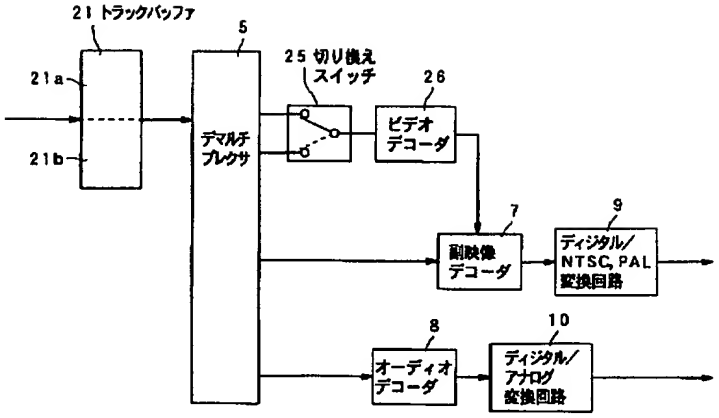
【図４】


(a)
(b)
(c)
(d)
(e)
(f)
14a
14b
14c
14a9
第9のアングル 第1のVOBU
第9のアングル 第1のVOBU
予測
14 フレームメモリ

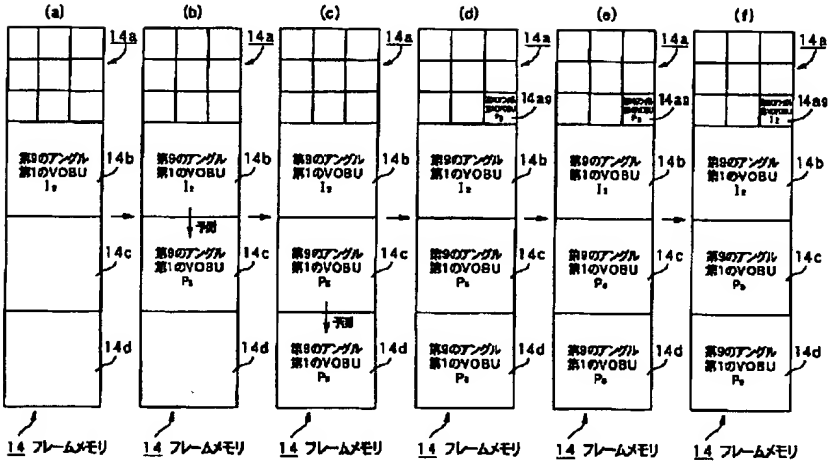
【図６】


14a2
14a1
14a3
14a4
14a6
14a
14a5
14a8
14a7
14a9
14b
14c
14d 第3の
復号用記憶領域
14 フレームメモリ

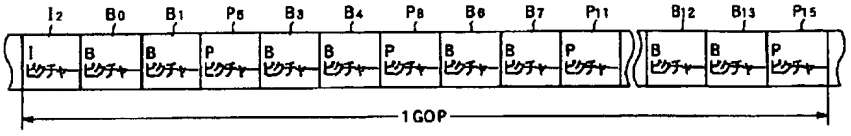
【図９】


21 トラックバッファ
5
25 切り換え
スイッチ
26
21a
21b
デマルチ
プレクサ
ビデオ
デコーダ
7
9
副映像
デコーダ
ディジタル/
NTSC, PAL
変換回路
8
10
オーディオ
デコーダ
ディジタル/
アナログ
変換回路

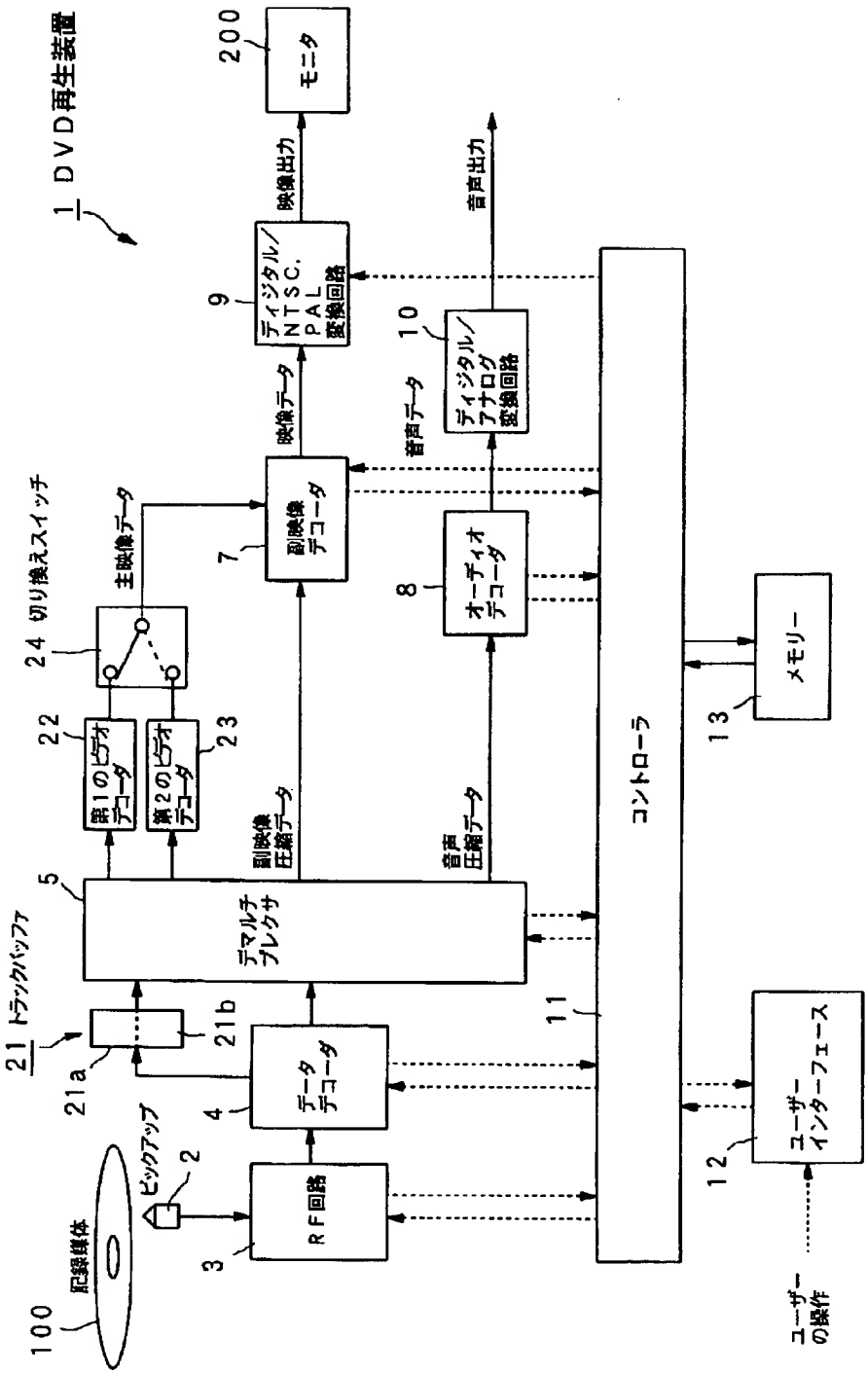
【図７】


(a)
(b)
(c)
(d)
(e)
(f)
14a
14b
14c
14d
14 フレームメモリ

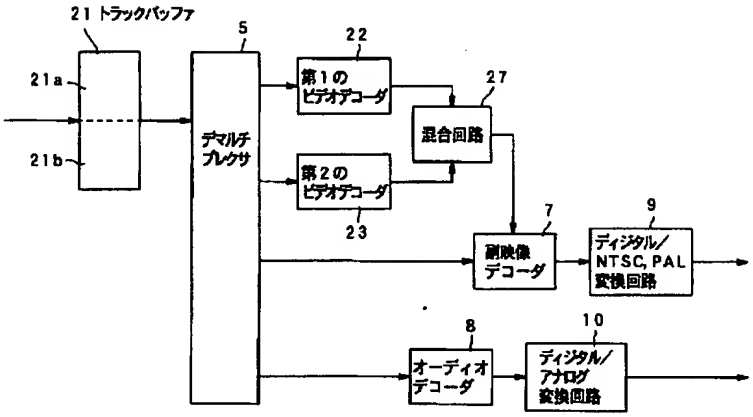
【図１５】


I2 B0 B1 P5 B3 B4 P8 B6 B7 P11 B12 B13 P15
Iピクチャ
Bピクチャ
Pピクチャ
1GOP

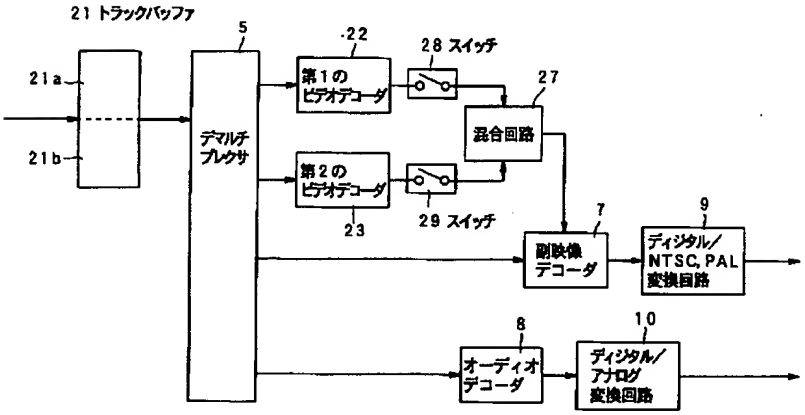
【図８】


1 DVD再生装置
100 記録媒体
2 ピックアップ
3 RF回路
4 データデコーダ
21 トラックバッファ
21a
21b
5 デマルチプレクサ
22 第1のビデオデコーダ
23 第2のビデオデコーダ
24 切り換えスイッチ
主映像データ
7 副映像デコーダ
副映像圧縮データ
音声圧縮データ
8 オーディオデコーダ
映像データ
音声データ
9 ディジタル/NTSC,PAL変換回路
10 ディジタル/アナログ変換回路
映像出力
音声出力
200 モニタ
11 コントローラ
12 ユーザーインターフェース
13 メモリー
ユーザーの操作

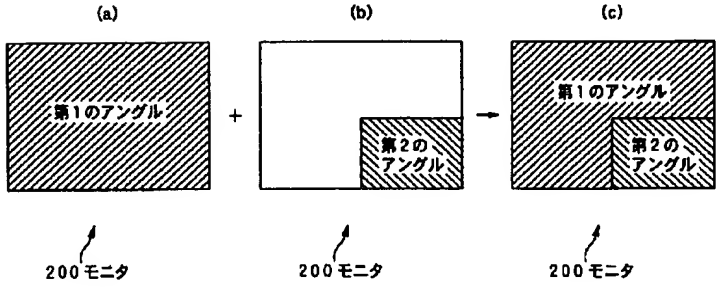
【図１０】


21 トラックバッファ
21a
21b
5
デマルチプレクサ
22
第1のビデオデコーダ
第2のビデオデコーダ
23
27
混合回路
7
副映像デコーダ
9
ディジタル/NTSC, PAL変換回路
8
オーディオデコーダ
10
ディジタル/アナログ変換回路

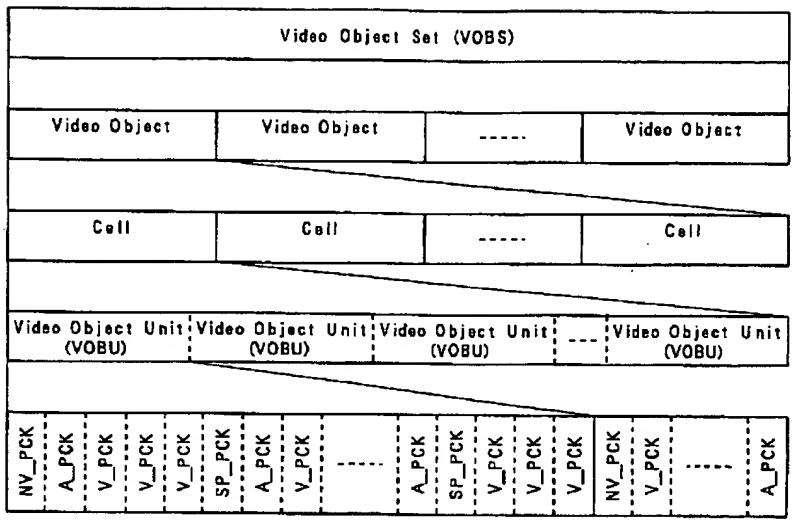
【図１１】


21 トラックバッファ
21a
21b
5
デマルチプレクサ
22
第1のビデオデコーダ
28 スイッチ
27
混合回路
第2のビデオデコーダ
23
29 スイッチ
7
副映像デコーダ
9
ディジタル/NTSC, PAL変換回路
8
オーディオデコーダ
10
ディジタル/アナログ変換回路

【図１３】


(a)
(b)
(c)
第1のアングル
+
第2のアングル
第1のアングル
第2のアングル
200 モニタ
200 モニタ
200 モニタ

【図１４】


Video Object Set (VOBS)
Video Object
Video Object

Video Object
Cell
Cell

Cell
Video Object Unit (VOBU)
Video Object Unit (VOBU)
Video Object Unit (VOBU)

Video Object Unit (VOBU)
NV_PCK
A_PCK
V_PCK
V_PCK
V_PCK
SP_PCK
A_PCK
V_PCK

A_PCK
SP_PCK
V_PCK
V_PCK
V_PCK
NV_PCK
V_PCK

A_PCK

【公報種別】特許法第１７条の２の規定による補正の掲載
【部門区分】第７部門第３区分
【発行日】平成16年12月2日(2004.12.2)

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【公開日】平成10年11月13日(1998.11.13)
【出願番号】特願平9-113136
【国際特許分類第７版】
Ｈ０４Ｎ　5/92
Ｇ１１Ｂ　20/10
Ｇ１１Ｂ　27/00
Ｈ０４Ｎ　7/32
【ＦＩ】
Ｈ０４Ｎ　5/92　Ｈ
Ｇ１１Ｂ　20/10　Ｅ
Ｇ１１Ｂ　27/00　Ｄ
Ｈ０４Ｎ　7/137　Ｚ
Ｇ１１Ｂ　27/00　Ｄ

【手続補正書】
【提出日】平成15年12月16日(2003.12.16)
【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】請求項１０
【補正方法】変更
【補正の内容】
【請求項１０】
複数アングルの映像が符号化画像データとされて記録されている記録媒体から、上記複数アングルの映像の符号化画像データを読み出す読み出し工程と、
上記読み出し工程で読み出した上記複数アングルの内の一のアングルの上記符号化画像データを復号して上記複数アングルの復号画像データを生成する復号工程と、
上記復号工程によって生成した上記複数アングルの内の一のアングルの上記復号画像データを記憶する復号画像データ記憶工程と、
分割表示するための記憶領域が形成されて、表示画像データを記憶する表示用記憶工程と、
上記復号画像データ記憶工程で記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶工程の有する上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御工程と
を有すること
を特徴とする信号再生方法。